

United States Environmental Protection Agency

Office of Chemical Safety and Pollution Prevention

# Risk Evaluation for 1,4-Dioxane

## Systematic Review Supplemental File:

Data Quality Evaluation of Environmental Releases and Occupational Exposure Data

CASRN: 123-91-1



June 2019

This document is a compilation of tables for the data extraction and evaluation for 1,4-Dioxane. Each table shows the data point or set or information element that was extracted and evaluated from a data source in accordance with Appendix D of the Application of Systematic Review in TSCA Risk Evaluations. If the source contains more than one data set or information element, the review provides an overall confidence score for each data set or information element that is found in the source. Therefore, it is possible that a source may have more than one overall quality/ confidence score.

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#### **Explanatory Notes**

These explanatory notes provide context to understand the short comments in the data evaluation tables.

Domain	Metric	Description of Comments Field
Reliability	Methodology	Indicates the sampling/analytical methodology, estimation method, or type of publication
Representativeness	Geographic Scope	Indicates the country of the study, publication, or underlying data
	Applicability	Indicates whether the data are for a condition of use within scope of the Risk Evaluation
	Temporal Representativeness	Provides the year of study, publication, or underlying data
	Sample Size	Describes the distribution of the sample or underlying data
Accessibility / Clarity	Metadata Completeness	Describes the completeness of the metadata
Variability and Uncertainty	Metadata Completeness	Indicates if study or publication addresses variability and uncertainty of the data or information

Releases to the Environment

Source Citation: Type of Data Source	Nicnas, 19 Releases to	998. 1, 4-Dioxane. Priority exist	ing chemica	al assessn Bielt Ag	nent rep	port No. 7.
Hero ID	3827412	o the Environment, Completed I	Exposure of	IUSK AS	sessmen	105,
EXTRACTION						
Parameter			Data			
Life Cycle Stage:			Commerc	ial Use		
Life Cycle Descrip	otion (Subca	ategory of Use):	Lab use			
Release Days per	Year:	0,00	50			
Waste Treatment	Method:		Sewage T	reatment	Plant	
EVALUATION						
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments
Domain 1: Beliah	ility					
	Metric 1:	Methodology	High	$\times 1$	1	NICNAS
Domain 2: Repres	entative					
	Metric 2:	Geographic Scope	Medium	$\times 1$	2	Australia
	Metric 3:	Applicability	High	$\times 2$	2	occupational scenario within the scope of the risk evaluation
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	1998
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Access	ibility/Clar	ity				
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Clear documentation of data sources, methods, results and assumptions
Domain 4: Variah	ility and Ur	ncertainty				
	Metric 7:	Metadata Completeness	Medium	$\times 1$	2	Limited discussion of variability and uncertainty
Overall Quality D	eterminatio	$\mathrm{n}^\dagger$	High		1.5	

Source Citation:Nicnas,.Type of Data SourceReleasesHero ID3827412	1998. 1, 4-Dioxane. Priority exist to the Environment; Completed 1	ting chemica Exposure or	al assessr Risk As	nent rep sessmer	port No. 7. hts;
EXTRACTION					
Parameter		Data			
Life Cycle Stage:		Commerc	ial. Pote	ntial Co	onsumer Use
Life Cycle Description (Sub	category of Use):	Film proc	cessing (f	ilm cem	uent use)
Release Days per Year:		50	0 (		
Number of Sites:		10			
Waste Treatment Method:		Sewage T	reatment	Plant	
EVALUATION					
Domain	Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments
Domain 1: Reliability Metric 1	Methodology	High	$\times 1$	1	NICNAS
Domain 2: Representative Motria 2	Coorrenhie Soone	Madium	× 1	0	A
Metric 2	Applicability	High	$\times 1$	2	Australia
Metric 4	Temporal Representativeness	Medium	$\times 2$	2 4	1008
Metric 5	Sample Size	N/A	× 2	N/A	No Comment.
Domain 3: Accessibility/Cla	urity				
Metric 6	Metadata Completeness	High	$\times 1$	1	Clear documentation of data sources, methods, results and assumptions
Domain 4: Variability and	Incertainty				
Metric 7	Metadata Completeness	Medium	$\times 1$	2	Limited discussion of variability and uncertainty
Overall Quality Determinat	ion <sup>†</sup>	High		1.5	

\* MWF = Metric Weighting Factor
† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.</li>

Source Citation:Nicnas,. 1Type of Data SourceReleases tHero ID3827412	998. 1, 4-Dioxane. Priority exist o the Environment; Completed 1	ing chemica Exposure or	al assessn <sup>.</sup> Risk As	nent rep sessmen	port No. 7. hts;
EXTRACTION					
Parameter		Data			
Life Cycle Stage:		Processin	g		
Life Cycle Description (Subc	ategory of Use):	Pharmace	eutical m	anufact	ure
Release Days per Year:		50			
Number of Sites:		1			
Waste Treatment Method:		Sewage T	reatment	Plant	
EVALUATION					
Domain	Metric	Rating	$MWF^*$	Score	Comments
Domain 1: Reliability					
Metric 1:	Methodology	High	$\times 1$	1	NICNAS
Domain 2: Bepresentative					
Metric 2:	Geographic Scope	Medium	× 1	2	Australia
Metric 3:	Applicability	High	$\times 2$	2	occupational scenario within the scope of the risk evaluation
Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	1998
Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accossibility/Clay	.;+.,-				
Metric 6:	Metadata Completeness	High	$\times 1$	1	Clear documentation of data sources, methods, results and as- sumptions
Domain 4. Variability and U	ncontaint				
Domain 4: variability and U	Motodata Completeness	Modium	$\sim 1$	9	Timited Jimurgian of equivality and uncertaint
	metadata Completeness	meanum	× 1	2	Limited discussion of variability and uncertainty
Overall Quality Determination	$\mathrm{n}^{\dagger}$	High		1.5	

Source Citation: Type of Data Source Hero ID	Carex, Canada. 2017. Profiles & estimates: 1,4-Dioxane. Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data; 3978382						
EXTRACTION							
Parameter			Data				
Life Cycle Stage:			Industrial	l Use			
Life Cycle Descrip	otion (Subca	ategory of Use):	Basic che	mical mf	r.		
Annual Release Q	uantity (kg	/yr):	5 tonnes		_		
EVALUATION							
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments	
Domain 1: Reliab	ility						
	Metric 1:	Methodology	High	$\times 1$	1	National Pollutant Release Inventory (NPRI)	
Domain 2: Repres	sentative						
	Metric 2:	Geographic Scope	Medium	$\times 1$	2	Canada	
	Metric 3:	Applicability	High	$\times 2$	2	occupational scenario within the scope of the risk evaluation	
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2015	
	Metric 5:	Sample Size	N/A		N/A	No Comment.	
Domain 3: Access	sibility/Clar	ity					
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Clear documentation of data sources, methods, results and as- sumptions	
Domain 4. Variah	ility and U	acontaint					
Domain 4: Variat	Metric 7:	Metadata Completeness	Low	× 1	3	Does not address variability or uncertainty	
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	High		1.4		

Source Citation:	2014. Toxic release inventory: 1,4-Dioxane.					
Type of Data Source	Releases to	o the Environment; Environment	tal Release	Data;		
Hero ID	3800452					
EXTRACTION			_			
Parameter			Data			
Life Cycle Stare:			Diepocal			
Bolooso Source:			All indust	triog		
Disposal /Troatm	ont Mothod		Undergro	und Injoc	etion W	olle Landfille Air
Environmental M	ent methou edia:	•	Water la	nd air		ens, Landinis, An
Release or Emissi	on Factor		BV2015 7	reless	505 m11	ltiple release and disposal categories
Release Estimatio	n Method		Self-repor	ted by in	dustry	for TBI
Annual Belease O	uantity (kg	/vr)·	1 291 650	lb/vr tot	tal on- :	and off-site disposal or other release
	daning (ng	/ 5 - ) -	1,201,000	10/91 000		
EVALUATION						
Domain		Metric	Rating	MWF*	Score	Comments
Domain 1: Reliab	ility					
	Metric 1:	Methodology	High	$\times 1$	1	US EPA, TRI, 'trusted source
Domain 2: Repres	entative	~	1			
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	$\times 2$	2	occupational scenario within the scope of the risk evaluation
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2015
	Metric 5:	Sample Size	Low	× 1	3	No statistics
Domain 3: Accoss	ibility/Clar	ity				
Domain 5. Access	Motric 6	Motadata Completeness	Modium	$\sim 1$	9	Includes most aritical metadata. TPI methodology can be re-
	Methe 0.	Metadata Completeness	Wearum	~ 1	2	viewed separately
Domain 4: Variab	ility and Ui	ncertainty				
	Metric 7:	Metadata Completeness	Low	× 1	3	Does not address variability or uncertainty
Overall Quality D	eterminatio	n'	High		1.6	

Source Citation:1996. SolvType of Data SourceReleases toHero ID3860540	rents study. o the Environment; Completed I	Exposure or	Risk As	sessmer	ats;
EXTRACTION Parameter		Data			
Life Cycle Stage: Release Source: Disposal /Treatment Method Environmental Media: Release or Emission Factor: Release Estimation Method: Annual Release Quantity (kg Number of Sites: Waste Treatment Method:	Data Processing, Use, Disposal Multiple, see p. 37 Incineration, energy recovery, fuel blending, WWT - tanks, POTW, WWT, Unspecified disposal Land, water, air Contains reported volumes and total loading by waste type (waste wa- ters, solids, organic waste) Facility reporting, 1993 RCRA 3007 Questionairre 207 million kg/yr, see p. 41 for brekadown by management practice 27 Multiple				
EVALUATION Domain	Metric	Rating	MWF*	Score	Comments
Domain 1: Reliability Metric 1:	Methodology	High	× 1	1	US EPA Solvents Study, trusted source
Domain 2: Representative Metric 2: Metric 3: Metric 4: Metric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	High High Low Low	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \\ \times \ 1 \end{array}$	1 2 6 3	US occupational scenario within the scope of the risk evaluation 1993 RCRA 3007 Questionairre Distribution of samples is qualitative or characterized by no statistics
Domain 3: Accessibility/Clar Metric 6:	ity Metadata Completeness	High	$\times 1$	1	Clear documentation of data sources, methods, results and as- sumptions
Domain 4: Variability and Un Metric 7:	ncertainty Metadata Completeness	Medium	× 1	2	Limited discussion of variability and uncertainty
	Cor	ntinued on r	next page	9	

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Source Citation: Type of Data Source Hero ID	1996. Solvents study. Releases to the Environment; Compl 3860540	leted Exposure or Risk .	Assessments;				
EVALUATION							
Domain	Metric	Rating MWF	T* Score	Comments			
Overall Quality D	$\operatorname{Petermination}^\dagger$	Medium	1.8				

Source Citation:	Dow Chemical, Company. 1989. Dow Chemical information submitted to EPA pursuant to section 8(e) of the Toxic Substances Contract Act (TSCA)							
Type of Data Source Hero ID	Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data; 3861185							
EXTRACTION Parameter			Data					
Life Cycle Stage:			Processin	g, non-in	corpora	tive		
Release Source:			Process s	olvent/st	abilizer	in chlorinated solvents		
Disposal /Treatment	nt Method	:	Aqueous	waste str	eam			
Environmental Me	dia:		Water					
Release or Emission	n Factor:		Not speci	fied				
Release Estimation	Method:		laborator	y simulat	ion and	analysis		
Waste Treatment M	Method:		Condense pors from adsorptio	or, then t n degreas n	ransfern sing ope	red to solvent-waste separator; or organic va- eartions may be treated by activated carbon		
P2 Control & perce	P2 Control & percent Efficiency:			Reports removal efficiency of activated sludge stream and carbon ad- sorption, see p. 27				
EVALUATION								
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments		
Domain 1: Reliabil	ity							
	Metric 1:	Methodology	High	$\times 1$	1	Dow Chemical information request response		
Domain 2: Represe	entative							
	Metric 2:	Geographic Scope	High	$\times 1$	1	US		
	Metric 3:	Applicability	High	$\times 2$	2	occupational scenario within the scope of the risk evaluation		
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1985		
	Metric 5:	Sample Size	Medium	$\times 1$	2	Distribution of samples is qualitative or characterized by no statistics		
Domain 3: Accessil	bility/Clar	ity						
	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	includes most critical metadata		
Domain 4: Variabil	lity and Ui	ncertainty						
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Does not address variability or uncertainty		
		Cor	ntinued on 1	next page	<u> </u>			

		maea nom p		Page				
Source Citation:	Dow Chemical, Company. 1989. Dow C Contract Act (TSCA).	hemical informa	ation sub	mitted t	DEPA pursuant to section 8(e) of the Toxic Substances			
Type of Data Source	Releases to the Environment; Reports f	Releases to the Environment: Reports for Data or Information Other than Exposure or Release Data:						
Hero ID	3861185				-			
EVALUATION								
Domain	Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments			
Overall Quality D	$\operatorname{Determination}^{\dagger}$	Medium		1.9				

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\* MWF = Metric Weighting Factor
† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.</li>

Source Citation: Type of Data Source Hero ID	1995. OPI Releases to 3860496	PT chemical fact sheets: 1, 4-Dic to the Environment; Reports for	oxane fact s Data or Inf	heet: Sup ormation	oport d Other	ocument. than Exposure or Release Data;
EXTRACTION Parameter			Data			
Life Cycle Stage: Release Source: Environmental Media: Release or Emission Factor:			Manufacturing, processing, and use TRI-reporting industries Air, water, land 1992 TRI - Total 1.13 million pounds released, 680 thousand pounds to atmosphere, 450 thousand pounds to surface waters, and 33 hundred pounds were released onto the land.			
Release Estimation Method:			Self-repor	ted by in	dustry	for TRI
EVALUATION						
Domain		Metric	Rating	$MWF^*$	Score	Comments
Domain 1: Reliab	ility Metric 1:	Methodology	High	$\times 1$	1	US EPA OPPT Chemical Fact Sheet, trusted source
Domain 2: Repres	sentative					
	Metric 2:	Geographic Scope	High	$\times 1$	1	US
	Metric 3:	Applicability	High	$\times 2$	2	occupational scenario within the scope of the risk evaluation
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1995 literature search
	Metric 5:	Sample Size	Medium	$\times 1$	2	Distribution of samples is characterized by a range with uncer- tain statistics. It is unclear if analysis is representative.
Domain 3: Access	ibility/Clar Metric 6:	ity Metadata Completeness	High	$\times 1$	1	Clear documentation of data sources, methods, results and as- sumptions
Domain 4: Variab	ility and U Motric 7:	ncertainty Motadata Completeness	Modium	× 1	9	Timited discussion of unichility and uncertainty
			Medium	~ 1	2	Eminted discussion of variability and uncertainty
Overall Quality D	eterminatio	$\mathbf{n}^{\intercal}$	Medium		1.7	

Type of Data SourceReleases toHero ID3809027	o the Environment; Completed 1	Exposure or	Risk As	sessmer	nts;					
EXTRACTION										
Parameter		Data								
Life Cycle Stage:	Life Cycle Stage:			Manufacturing, processing, and use						
Release Source:	Release Source:				5,					
Disposal /Treatment Method	Incinerati	ion								
Environmental Media:			Environmental releases of 1,4-dioxane to air and water may contribute to ecological and general population exposures. The potential for release of 1,4-dioxane to air is high due to the high vapor pressure of 1,4-dioxane and disposal through incineration. Industrial and commercial use of 1,4- dioxane and presence in consumer products suggest releases to water are possible							
Release or Emission Factor:	Reports r 1988 to 2	eleases fr 007	om TRI	I, notes generally decreasing total releases from						
Release Estimation Method:	Self-reported by industry for TRI									
Annual Release Quantity (kg	Annual Release Quantity (kg/yr):			s from 7	FRI, see document					
Number of Sites:		39 to $45$								
EVALUATION										
Domain	Metric	Rating	$MWF^{\star}$	Score	Comments					
Domain 1: Reliability										
Metric 1:	Methodology	High	$\times 1$	1	TSCA Work Plan Chemical					
Domain 2. Ponrecontativo										
Metric 2:	Geographic Scope	High	× 1	1	US					
Metric 3:	Applicability	High	$\times 2$	2	Scenario within the scope of the risk evaluation					
Metric 4:	Temporal Representativeness	High	$\times 2$	2	2015					
Metric 5:	Sample Size	Medium	× 1	2	Distribution of samples is characterized by a range with uncer- tain statistics. It is unclear if analysis is representative.					
Domain 3. Accossibility/Clar	;+									
Metric 6:	Metadata Completeness	High	$\times 1$	1	Clear documentation of data sources, methods, results and assumptions					
Domain 4: Variability and U	ncertainty									
	Cor	tinued on 1	next page	)						

Source Citation: Type of Data Source Hero ID	U.S, E. P. Releases to 3809027	U.S, E. P. A. 2015. TSCA work plan chemical problem formulation and initial assessment. 1,4-Dioxane. Releases to the Environment; Completed Exposure or Risk Assessments; 3809027							
EVALUATION									
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments			
	Metric 7:	Metadata Completeness	High	$\times 1$	1	clear documentation of variability and uncertainty			
Overall Quality Determination <sup><math>\dagger</math></sup>			High		1.1				

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\* MWF = Metric Weighting Factor

Source Citation:Atsdr., 2012. Toxicological profile for 1,4-dioxane.Type of Data SourceReleases to the Environment; Environmental Release Data;Hero ID3982333									
EXTRACTION Parameter	EXTRACTION Parameter			Data					
Life Cycle Stage:		Manufact	Manufacturing, processing, and use						
Life Cycle Description (Subca	ategory of Use):	All stages							
Release Source:		TRI-repo	rting ind	ustries					
Environmental Media		Environm	ental rel	vv eases of	1 4-diovane to air and water may contribute				
Environmental Media:			to ecological and general population exposures. The potential for release of 1,4-dioxane to air is high due to the high vapor pressure of 1,4-dioxane and disposal through incineration. Industrial and commercial use of 1,4- dioxane and presence in consumer products suggest releases to water are possible						
Release or Emission Factor:	Reports r	Reports releases from TRI, notes generally decreasing total releases from							
Release Estimation Method: Annual Release Quantity (kg/yr):		Self-reported by industry for TRI Multiple estimates from TRI, see document							
EVALUATION									
Domain	Metric	Rating	$MWF^{\star}$	Score	Comments				
Domain 1: Reliability Metric 1:	Methodology	High	$\times 1$	1	ATSDR Toxicological Profile				
Domain 2: Roprosontativo									
Metric 2:	Geographic Scope	High	× 1	1	US				
Metric 3:	Applicability	High	$\times 2$	2	Scenario within the scope of the risk evaluation				
Metric 4:	Temporal Representativeness	High	$\times 2$	2	2012				
Metric 5:	Sample Size	High	$\times 1$	1	TRI Sites				
Domain 3: Accessibility/Clar	ity								
Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Includes media, life cycle stage, and annual releases				
Domain 4: Variability and U	ncertainty								
Continued on next page									

					1.9.		
Source Citation: Type of Data Source Hero ID	Atsdr,. 2012. Toxicological profile for 1,4-dioxane. Releases to the Environment; Environmental Release Data; 3982333						
EVALUATION							
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments	
	Metric 7:	Metadata Completeness	High	$\times 1$	1	States that TRI data isn't 100 percent reliable since only cer- tain sites are required to report.	
Overall Quality Determination <sup><math>\dagger</math></sup>		High		1.1			

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\* MWF = Metric Weighting Factor

Source Citation:Nih,. 2016. Report on carcinogens: 1,4-Dioxane.Type of Data SourceReleases to the Environment; Environmental Release Data;Hero ID3982327							
EXTRACTION							
Parameter		Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Release Source: Environmental Media: Release Estimation Method: Annual Release Quantity (kg/yr): Number of Sites:			Manufacturing, processing, and use All stages TRI-reporting industries 46 percent Air27 percent Surface water26 percent underground injection Self-reported by industry for TRI 309,000 lb 53				
EVALUATION			MUUD+				
Domain	Metric	Rating	M W F**	Score	Comments		
Domain 1: Reliability Metric 1:	Methodology	High	$\times 1$	1	Department of Health and Human Services NTP		
Domain 2: Representative							
Metric 2:	Geographic Scope	High	$\times 1$	1	US		
Metric 3:	Applicability	High	$\times 2$	2	Scenario within the scope of the risk evaluation		
Metric 4:	Temporal Representativeness	High	$\times 2$	2	2016		
Metric 5:	Sample Size	High	$\times 1$	1	TRI Sites		
Domain 3: Accessibility/Clarity Metric 6: Metadata Completeness			$\times 1$	2	Includes media and total releases		
Domain 4: Variability and U	ncertainty	т	1				
Metric 7:	Metadata Completeness	Low	× 1	3	Does not address variability or uncertainty		
Overall Quality Determination <sup><math>\dagger</math></sup>		High		1.3			

Source Citation:	Fujiwara, T., Tamada, T., Kurata, Y., Ono, Y., Kose, T., Ono, Y., Nishimura, F., Ohtoshi, K. 2008. Investigation of 1,4-dioxane originating from incineration residues produced by incineration of municipal solid waste. Chemosphere.								
Type of Data Source Hero ID	Releases to 3579380	Releases to the Environment; Environmental Release Data; 3579380							
EXTRACTION Parameter			Data						
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Release Source: Release or Emission Factor: Number of Sites:			Disposal Disposal Incineration, landfill leachate Up to 340 ug/L detected in leachate 2 landfills3 incineration sites						
EVALUATION					_				
Domain		Metric	Rating	MWF*	Score	Comments			
Domain 1: Reliab	ility Metric 1:	Methodology	High	$\times 1$	1	Research paper from Chemosphere			
Domain 2: Repres	sentative								
1	Metric 2:	Geographic Scope	Medium	$\times 1$	2	Japan			
	Metric 3:	Applicability	High	$\times 2$	2	Scenario within the scope of the risk evaluation			
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2008			
	Metric 5:	Sample Size	High	$\times 1$	1	38 samples from landfill sites			
Domain 3: Access	sibility/Clar Metric 6:	ity Metadata Completeness	High	× 1	1	Includes total leachate produced/day, emission factors for diosane form samples			
Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness		High	× 1	1	clear documentation of variability and uncertainty				
Overall Quality Determination <sup>†</sup>		High		1.1					

Source Citation: Type of Data Source Hero ID	Chemistry Industry Association of, Canada. 2017. All substances emissions for 2012 and projections for 2015. Releases to the Environment; Environmental Release Data; 3982361						
EXTRACTION Parameter			Data				
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Annual Release Quantity (kg/yr): Number of Sites:			Manufacturing, processing, and use All stages 4.8 tonnes in 2012 (Actual)6 tonnes in 2015 (projected) 2				
EVALUATION		Metric	Bating	MWF*	Score	Comments	
		nound	itating			Commente	
Domain 1: Reliab	Metric 1:	Methodology	High	$\times 1$	1	Chemistry Industry Assocation of Canada	
Domain 2: Repre	sentative Metric 2:	Geographic Scope	Medium	$\times 1$	2	Canada	
	Metric 3: Metric 4: Metric 5:	Applicability Temporal Representativeness Sample Size	Low High N/A	$\times 2 \times 2$	6 2 N/A	Unsure what scenario data is for 2012 No Comment.	
Domain 3: Access	sibility/Clar Metric 6:	ity Metadata Completeness	Low	$\times 1$	3	Includes annual release for the two sites, but no other data	
Domain 4: Variab	ility and Uı Metric 7:	ncertainty Metadata Completeness	Low	× 1	3	Does not address variability or uncertainty	
Overall Quality Determination <sup>†</sup>		Medium		2.1			

Source Citation: Type of Data Source Hero ID	Chemistry Industry Association of, Canada. 2017. All substances emissions for 2011 and projections for 2014. Releases to the Environment; Environmental Release Data; 3982362						
EXTRACTION Parameter			Data				
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Annual Release Quantity (kg/yr): Number of Sites:			Manufacturing, processing, and use All stages 7.25 tonnes in 2011 (actual)7.3 tonnes in 2014 (projected) 1				
EVALUATION		Motrie	Dating	MWE*	Secre	Commente	
Domain		Metric	Rating	MIWF ^	Score	Comments	
Domain 1: Reliab	ility Metric 1:	Methodology	High	× 1	1	Chemistry Industry Assocation of Canada	
Domain 2: Repre	sentative						
*	Metric 2:	Geographic Scope	Medium	$\times 1$	2	Canada	
	Metric 3:	Applicability	Low	$\times 2$	6	Unsure what scenario data is for	
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2011	
	Metric 5:	Sample Size	N/A		N/A	No Comment.	
Domain 3: Access	sibility/Clar Metric 6:	ity Metadata Completeness	Low	$\times 1$	3	Includes annual release for the site, but no other data	
Domain 4: Variat	Motrie 7:	Motadata Completeness	Low	$\times 1$	2	Deservet oddress serieliliter an uncertainte	
	metric 7:	metadata Completeness	LOW	× 1	ა	Does not address variability or uncertainty	
Overall Quality Determination <sup><math>\dagger</math></sup>		Medium		2.1			

Source Citation:	Fl, D. E. P 2002. Gulf States Chemical: County Road 158: Lloyd, Florida: Jefferson County: Northeast district: Site lead:							
Type of Data Source Hero ID	Releases to 3986456	Releases to the Environment; Environmental Release Data; 3986456						
EXTRACTION Parameter			Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Release Source: Environmental Media: Release or Emission Factor:			Disposal Disposal Runoff from leaking tanks, tank rinsate Water 7.2 ug/L detected in sampling					
EVALUATION		Mateira	Deting	MANDA	C	Commente		
Domain		Metric	Rating	MWF**	Score	Comments		
Domain 1: Reliab	ility Metric 1:	Methodology	High	$\times 1$	1	Florida DEP		
Domain 2: Repres	sentative							
	Metric 2:	Geographic Scope	High	$\times 1$	1	US		
	Metric 3:	Applicability	High	$\times 2$	2	Scenario within the scope of the risk evaluation		
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2011		
	Metric 5:	Sample Size	High	$\times 1$	1	Multiple wells sampled		
Domain 3: Access	ibility/Clar Metric 6:	ity Metadata Completeness	Medium	$\times 1$	2	Includes some sampling information, but not much information about the processes performed at the plant		
Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness		Low	$\times 1$	3	Does not address variability or uncertainty			
Overall Quality Determination <sup>†</sup>		High		1.3				

Source Orlation.O.S., E. F. A.: 2000. Treatment Technologies for 1,4-Dioxate. Fundamentals and Field Applications.Type of Data SourceReleases to the Environment; Environmental Release Data;Hero ID3809053								
EXTRACTION		Data						
		Data						
Life Cycle Stage:	Life Cycle Stage:		Manufacturing, processing, and use					
Life Cycle Description (Subcategory of Use):		All stages	;					
Release Source:		2002  TRI	Reportin	ng indu	stries			
Environmental Media:		Water, ai	r, land, o	off-site.	Water is primary concern.			
Annual Release Quantity (kg	/yr):	1,146,641	lb/yr to	tal (list:	s amounts for each media)			
Number of Sites:		11 listed i	in table					
Waste Treatment Method:		Advanced	l oxidatic	n, biore	emediation, adsorption (GAC)			
P2 Control & percent Efficiency:		sites and	technolog	gies	a final contaminant concentrations for different			
EVALUATION								
Domain	Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments			
Domain 1: Beliability								
Metric 1:	Methodology	High	$\times 1$	1	EPA Office of Solid Waste and Emergency Response			
Domain 2: Representative								
Metric 2:	Geographic Scope	High	$\times 1$	1	US			
Metric 3:	Applicability	High	$\times 2$	2	Scenario within the scope of the risk evaluation			
Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2006			
Metric 5:	Sample Size	High	$\times 1$	1	TRI Sites			
Domain 3: Accessibility/Clar	ity							
Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Includes media and total releases			
Domain 4: Variability and Un	ncertainty	TT: 1	1	1				
Metric 7:	Metadata Completeness	High	× 1	1	States that TRI data isn't 100 percent reliable since only cer- tain sites are required to report.			
Overall Quality Determination <sup><math>\dagger</math></sup>				1.3				

U.S.E.P.A. 2006. Treatment Technologies for 1.4-Diovane: Fundamentals and Field Applications. Source Citation:

\* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID	Adeq,. 201 Releases to 3982201	Adeq, 2012. Tucson International Airport Area (TIAA) overview: EPA cercla site. Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data; 3982201						
EXTRACTION								
Parameter			Data					
Life Cycle Stage:			Processing, and	d use				
Waste Treatment Method:			Advanced Oxidation Treatment system, Granular activated carbon (GAC) to treat contaminated groundwater					
EVALUATION								
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments		
Domain 1: Reliab	ility							
	Metric 1:	Methodology	High	$\times 1$	1	Arizona DEQ, EPA		
Domain 2: Repres	sentative							
1	Metric 2:	Geographic Scope	High	$\times 1$	1	US		
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	Groundwater remediation activities (out of scope)		
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2012		
	Metric 5:	Sample Size	N/A		N/A	No Comment.		
Domain 3: Access	sibility/Clari	tv						
	Metric 6:	Metadata Completeness	N/A		N/A	N/A - No Sampling		
Domain 4: Variah	vility and Ur	cortainty						
Domain 4. Vallat	Metric 7:	Metadata Completeness	N/A		N/A	N/A - No Sampling		
Overall Quality D	eterminatio	n <sup>†</sup>	Unacceptable		4.0	Metric Mean Score: 2.0.		

\*\* Consistent with our Application of Systematic Review in TSCARisk Evaluations document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

\* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID	Adeq,. 201 Releases to 3982191	Adeq. 2017. National priorities list (NPL) sites (federal superfund): Tucson International Airport area (TIAA) overview. Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data; 3982191								
EXTRACTION			Data							
Parameter			Data							
Life Cycle Stage:			Processing, and use							
Waste Treatment Method:			Advanced Oxi (GAC) to treat	Advanced Oxidation Treatment system, Granular activated carbon (GAC) to treat contaminated groundwater						
EVALUATION										
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments				
Domain 1: Boliah	ility									
	Metric 1:	Methodology	High	$\times 1$	1	Arizona DEQ, EPA				
Domain 2. Bepres	sentative									
Domain 2. Repres	Metric 2:	Geographic Scope	High	× 1	1	US				
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	Groundwater remediation activities (out of scope)				
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2012				
	Metric 5:	Sample Size	N/A		N/A	No Comment.				
Domain 3: Access	sibility/Clari	ty								
Domain 0. Recess	Metric 6:	Metadata Completeness	N/A		N/A	N/A - No Sampling				
Damain 4. Variah	:1:4									
Domain 4: Variat	Metric 7:	Metadata Completeness	N/A		N/A	N/A - No Sampling				
Overall Quality D	eterminatio	n <sup>†</sup>	Unacceptable		4.0	Metric Mean Score: 2.0.				

\*\* Consistent with our Application of Systematic Review in TSCARisk Evaluations document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

\* MWF = Metric Weighting Factor

Source Citation:201Type of Data SourceRelHero ID386	2017. Pollution prevention search results, envirofacts database. Releases to the Environment; Environmental Release Data; 3860453							
EXTRACTION Parameter			Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Release Source: Disposal /Treatment Method: Daily Release Quantity (kg/day): Annual Release Quantity (kg/yr): Number of Sites: Waste Treatment Method: P2 Control & percent Efficiency:			Use Multiple Subcategories NAICS code provided for each site Pollution prevention method listed for each site Pollution prevention method listed for each site Lists current year and prior year releases 51 sites in the table with Dioxane releases Pollution prevention method listed for each site Pollution prevention method listed for each site Sites and after					
<b>EVALUATION</b> Domain		Metric	Rating	MWF*	Score	Comments		
Domain 1: Reliability Me	tric 1:	Methodology	High	× 1	1	USEPA Envirofacts		
Domain 2: Representa Me Me Me	tric 2: tric 2: tric 3: tric 4: tric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	High High High High	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \\ \times \ 1 \end{array}$	$\begin{array}{c} 1\\ 2\\ 2\\ 1\end{array}$	US Scenarios within the scope of the risk evaluation Range: 2007-2015 TRI Sites		
Domain 3: Accessibilit Me	ty/Clar tric 6:	ity Metadata Completeness	Medium	× 1	2	Includes releases, NAICS, and P2/Efficiency		
Domain 4: Variability Me	and U tric 7:	ncertainty Metadata Completeness	Low	× 1	3	Does not address variability or uncertainty		
Overall Quality Deter	minatic	$\mathbf{n}^{\dagger}$	High		1.3			

Source Citation: Type of Data Source Hero ID	Environme Releases to 3981144	ent Canada, Health Canada. 201 o the Environment; Reports for 1	0. Screen Data or I	ing asses nformatio	ssment f on Othe	for the challenge 1,4-dioxane. er than Exposure or Release Data;
EXTRACTION						
Parameter			Data			
Life Cycle Stage			Disposa	1		
Life Cycle Descrip	otion (Subca	tegory of Use):	Disposa	1		
Release Source:	(		2006 TI	RI		
Environmental Me	edia:		air, wat	er, under	rground	injection
Annual Release Q	uantity $(kg)$	/yr):	56  tonn	es air, 22	tonnes	s water, 64 tonnes UI
EVALUATION						
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments
	•1•,					
Domain 1: Reliab	Ility		II:l.	1	1	
	Metric 1:	Methodology	High	× 1	1	Environment Canada/Health Canada
Domain 2: Repres	sentative					
	Metric 2:	Geographic Scope	High	$\times 1$	1	US
	Metric 3:	Applicability	High	$\times 2$	2	Scenarios within the scope of the risk evaluation
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2010
	Metric 5:	Sample Size	High	$\times 1$	1	TRI Sites
Domain 3: Access	ibility/Clari	ity	TT: 1	1	1	
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and as- sumptions
D . 4 V . 1	•1•4 1 1 1					
Domain 4: Variab	Matrie 7	Matadata Completeness	Himb	V 1	1	
	Metric 7:	Metadata Completeness	High	× 1	1	clear documentation of variability and uncertainty
Overall Quality D	eterminatio	$\mathrm{n}^\dagger$	High		1.0	
• 0			U			

\* MWF = Metric Weighting Factor
† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.</li>

Source Citation: Type of Data Source	Environme Releases to	ent Canada, Health Canada. 201 o the Environment; Reports for	l0. Screenir Data or Inf	ng assessr formation	nent for Other	the challenge 1,4-dioxane. than Exposure or Release Data;
Hero ID	3981144					
EXTRACTION						
Parameter			Data			
Life Cycle Stage:			Disposal			
Life Cycle Descrit	otion (Subca	tegory of Use):	Disposal			
Release Source:	(		2006 NPI	RI Canad	a	
Environmental M	edia:		air, water	•		
Annual Release Q	uantity (kg	/yr):	13,800 kg	air, 6,50	0 kg wa	ter
EVALUATION						
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments
Domain 1: Reliab	ility					
	Metric 1:	Methodology	High	$\times 1$	1	Environment Canada/Health Canada
Domain 2: Ropros	ontativo					
Domain 2. Repres	Metric 2.	Geographic Scope	Medium	× 1	2	Canada
	Metric 3:	Applicability	High	$\times 2$	2	Scenarios within the scope of the risk evaluation
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2010
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 2: Access	ibility/Clari	;+.,				
Domani 5. Access	Metric 6:	Metadata Completeness	High	$\times 1$	1	Clear documentation of data sources, methods, results and as- sumptions
Domain 4. Variab	ility and Ur	acortainty				
Domain 4: Variat	Metric 7.	Metadata Completeness	High	× 1	1	clear documentation of variability and uncertainty
			8	/\ <b>I</b>	Ŧ	accumentation of variability and ancoroanity
Overall Quality D	eterminatio	$\mathrm{n}^\dagger$	High		1.1	

\* MWF = Metric Weighting Factor
† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.</li>

Source Citation: Type of Data Source Hero ID	Matienzo, L. V 1989. Staff report on development of treatment standards for non-RCRA solvent waste. Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data; 3982116							
EXTRACTION Parameter			Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Waste Treatment Method:		Disposal Disposal Describes different treatment methods for non-wastewater streams based on solvent concentration in the stream						
EVALUATION								
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments		
Domain 1: Reliab	ility Metric 1:	Methodology	High	$\times 1$	1	California Department of Health Services		
D : 0 D	, , <b>.</b>							
Domain 2: Repres	Motrie 2:	Coorraphie Scope	High	$\sim 1$	1			
	Metric 2:	Applicability	High	$\times 1$ $\times 2$	1	US Sconarios within the scope of the rick evaluation		
	Metric 4:	Temporal Representativeness	Low	$\times 2 \times 2$	6	1989		
	Metric 5:	Sample Size	N/A	~ -	N/A	No Comment.		
Domain 3: Access	sibility/Clar Metric 6:	ity Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and as-		
						sumptions		
Domain 4: Variab	oility and Ur	ncertainty						
	Metric 7:	Metadata Completeness	High	$\times 1$	1	clear documentation of variability and uncertainty		
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	High		1.5			

Source Citation: Type of Data Source Hero ID	Adeq,. 201 Releases to 3982188	Adeq,. 2017. National priorities list (NPL) sites (federal superfund): Air Force plant 44 (AFP-44)/Raytheon project area. Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data; 3982188							
EXTRACTION									
Parameter			Data						
Life Cycle Stage:			Processing, and	d use					
Waste Treatment Method:			Advanced Oxi (GAC) to treat	dation 5 t contam	Freatmer inated g	nt system, Granular activated carbon roundwater			
EVALUATION									
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments			
Domain 1: Beliab	ility								
	Metric 1:	Methodology	High	$\times 1$	1	Arizona DEQ, EPA			
Domain 2: Repres	sentative								
	Metric 2:	Geographic Scope	High	$\times 1$	1	US			
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	Groundwater remediation activities (out of scope)			
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2012			
	Metric 5:	Sample Size	N/A		N/A	No Comment.			
Domain 3: Access	ibility/Clari	tv							
	Metric 6:	Metadata Completeness	N/A		N/A	N/A - No Sampling			
Domain 4. Variah	ility and Ur	cortainty							
Domain 4. Vallat	Metric 7:	Metadata Completeness	N/A		N/A	N/A - No Sampling			
Overall Quality D	eterminatio	n <sup>†</sup>	Unacceptable		4.0	Metric Mean Score: 2.0.			

\*\* Consistent with our Application of Systematic Review in TSCARisk Evaluations document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

\* MWF = Metric Weighting Factor

Source Citation:	U.S, E. P. A. 1978. OAQPS guideline series: Control of volatile organic emissions from manufacture of synthesized pharm								
Type of Data Source Hero ID	Releases to 3970050	the Environment; Environmen	tal Release Data;						
EXTRACTION									
Parameter			Data						
Life Cycle Stage:			Use						
Life Cycle Descrip	tion (Subca	tegory of Use):	Industrial	l Use - P	harmace	euticals			
Release Source:			Dryers, re	eactors, o	listillati	ion units, storage and transfer, filters, extrac-			
			tors, cent	rifuges, c	rystalliz	zers (first 4 majority of emissions)			
Environmental Me	edia:		Air, conti	act haul					
Release Estimation	n Method:		Cites EP	A 1977 (	emissior	n factors/equations for releases from storage			
			tanks. Al	so App E	s from p	process equipment.			
Annual Release Q	uantity (kg	/yr):	2 metric	tons to a	r, 41  m	anics with different control took in Table 3.1			
			$(in M\sigma/v)$	r not dio	rane sn	ecific just VOCs) Other tables have emissions			
				er steps i	1 proces	ss, but do not list dioxane.			
Number of Sites:			800 Pharmaceutical plants in the US and territories						
P2 Control & perc	cent Efficier	icy:	Storage and transfer: vapor return lines, vent condensers, conserva-						
			tion vents, vent scrubbers, pressure tanks, carbon adsorbers, floating						
			roofs.Everything else: Condensers, scrubbers, and carbon adsorbers.						
			Methods for calculating efficiencies in Ch.4						
EVALUATION									
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments			
Demois 1. Deliela									
Domain 1: Reliabl	Motrie 1.	Mathadalagy	Uich	× 1	1				
	metric 1.	Methodology	IIIgII	× 1	1	EPA OAQPS			
Domain 2: Repres	entative								
	Metric 2:	Geographic Scope	High	$\times 1$	1	US			
	Metric 3:	Applicability	High	$\times 2$	2	Scenarios within the scope of the risk evaluation			
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1978			
	Metric 5:	Sample Size	Medium	× 1	2	Some data from 26 sites. Some information is general to all sites			
Domain 3: Access	ibility/Clar	ity							
Continued on next page									

Source Citation:	U.S, E. P. ceutical pr	U.S, E. P. A. 1978. OAQPS guideline series: Control of volatile organic emissions from manufacture of synthesized pharma- ceutical products.								
Type of Data Source	Releases to	Releases to the Environment; Environmental Release Data;								
Hero ID	3970050									
EVALUATION										
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments				
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Clear documentation of data sources, methods, results and as- sumptions				
Domain 4: Variał	bility and Un Metric 7:	ncertainty Metadata Completeness	High	× 1	1	clear documentation of variability and uncertainty - states gen- eralizations are difficult since there is a lot of variability be- tween plants and volumes of chemicals used				
Overall Quality I	Determinatio	$\mathrm{n}^\dagger$	High		1.6					

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Source Citation: Type of Data Source Hero ID	U.S, E. P. Releases to 3982118	U.S, E. P. A 1992. The toxics release inventory. Hazardous Waste and Hazardous Materials. Releases to the Environment; Environmental Release Data; 3982118							
EXTRACTION			Data						
Parameter			Data						
Life Cycle Stage:			Manufa	cturing, j	processi	ing, and use			
Life Cycle Descrip	ption (Subca	ategory of Use):	All stag	jes					
Annual Release Q	Quantity (kg	/yr):	1,092,86	52 lbs tot	al in 19	88			
EVALUATION									
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments			
Domain 1: Reliab	oility								
	Metric 1:	Methodology	High	$\times 1$	1	EPA, TRI			
Domain 2: Repres	sentative								
*	Metric 2:	Geographic Scope	High	$\times 1$	1	US			
	Metric 3:	Applicability	Low	$\times 2$	6	General overview of TRI, Gave a total release of dioxane for one year			
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1992			
	Metric 5:	Sample Size	N/A		N/A	No Comment.			
Domain 3: Access	sibility/Clar	itv							
	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.			
Domain 4: Variab	oility and Ur	ncertainty							
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.			
Overall Quality D	Determinatio	$\mathbf{n}^{\dagger}$	Low		2.3				

Source Citation: Type of Data Source Hero ID	1999. Revi Releases to 1261630	ised Risk Assessment for the Air o the Environment; Published M	Character lodels for E	istic Stud xposures	ly Voluı or Rele	me I Overview. eases;
EXTRACTION						
Parameter			Data			
Life Cycle Stage:			Diepogal			
Life Cycle Descrit	otion (Subce	aterory of Use).	Disposal			
Belease Source:	Suber (Suber	itegory of ese).	Waste ma	anagemen	t units	landfill
Release Estimatio	n Method:		CHEMD	AT8 Mod	eling	
					. 0	
EVALUATION						
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments
Domain 1. Rolinh	ilitar					
Domain 1. Menab	Metric 1	Methodology	High	× 1	1	EPA OSW
		memodology	111.511	~ 1	-	
Domain 2: Repres	sentative					
*	Metric 2:	Geographic Scope	High	$\times 1$	1	US
	Metric 3:	Applicability	High	$\times 2$	2	Model for emissions from waste disposal
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	1999
	Metric 5:	Sample Size	N/A		N/A	No Comment.
	·1 ·1· / / / / / ·	•,				
Domain 3: Access	Metric 6:	ity Metadata Completeness	High	$\times 1$	1	Clear documentation of data sources, methods, results and as- sumptions
Domain 4: Variab	oility and Ur	ncertainty	TT: 1	1	-	
	Metric 7:	Metadata Completeness	Hıgh	$\times 1$	1	clear documentation of variability and uncertainty
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	High		1.2	

\_\_\_\_\_

Source Citation:EoType of Data SourceReHero ID19	Ecjrc, 2002. European Union risk assessment report: 1,4-dioxane. 2nd Priority List. Releases to the Environment; Completed Exposure or Risk Assessments; 196351								
EXTRACTION Parameter			Data						
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Environmental Media: Release or Emission Factor: Release Estimation Method: Daily Release Quantity (kg/day): Release Days per Year: Number of Sites:			Manufacture, Processing Manufacture, Processing air, water, incineration emission factors for different industries (Tables 3.2, 3.3, 3.5) derived from US emissions factors, TRI and industry data daily releases for different industries (Tables 3.2, 3.3, 3.5) days/year for different industries (Tables 3.2, 3.3, 3.5) 5						
<b>EVALUATION</b> Domain		Metric	Rating	MWF*	Score	Comments			
Domain 1: Reliability M	etric 1:	Methodology	High	× 1	1	European Chemicals Bureau			
Domain 2: Represent	ative	Coorner bie Goome	Mallin	v 1	0				
M M M	etric 2: etric 3:	Applicability	High Medium	$\times 1$ $\times 2$ $\times 2$	2 2 4	EU Scenarios within the scope of the risk evaluation			
M	etric 5:	Sample Size	Medium	× 2 × 1	2	Some datasets are represented as ranges with averages and 90th percentile, some are just ranges. The report provides recommended final values, but it is unclear how they got them.			
Domain 3: Accessibil M	ity/Clari etric 6:	ty Metadata Completeness	Medium	× 1	2	Some datasets are represented as ranges with averages and 90th percentile, some are just ranges. The report provides recommended final values, but it is unclear how they got them.			
Domain 4: Variability M	y and Ur etric 7:	ncertainty Metadata Completeness	High	× 1	1	clear documentation of variability and uncertainty			
Overall Quality Deter	rminatio	n†	High		1.6				
Continued on next page									

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Source Citation: Type of Data Source Hero ID	Ecjrc, 2002. European Union risk assessment report: 1,4-dioxane. 2nd Priority List. Releases to the Environment; Completed Exposure or Risk Assessments; 196351						
EVALUATION							
Domain	Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments		

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\* MWF = Metric Weighting Factor
Source Citation:Aca, 2015. Re: TSCA Work Plan Chemical Problem Formulaton and Initial Assessment for 1,4-Dioxane.Type of Data SourceReleases to the Environment; Reports for Data or Information Other than Exposure or Release Data; 3809105									
EXTRACTION		_							
Parameter		Data							
Life Cycle Stage:			Manufacturing, processing, and use						
Life Cycle Description (Subc	ategory of Use):	All stag	jes	-					
Disposal /Treatment Method	l:	incinera	tion, UI,	waste	broker				
Environmental Media:		water, a	ir, land						
Annual Release Quantity (kg	/yr):	87,166 l	b/y to ai	r19,134	to surface water 1,035,300 to UI and waste broker				
Number of Sites:									
EVALUATION									
Domain	Motrio	Poting	MWE*	Saoro	Commente				
Domain	Metric	Rating	IVI VV F	Score	Comments				
Domain 1: Reliability									
Metric 1:	Methodology	High	$\times 1$	1	2015 PF (US EPA)				
Domain 2. Ronnogentation									
Motrie 2:	Coographic Scope	High	$\sim 1$	1	110				
Metric 2. Metric 3:	Applicability	High	$^{\land 1}$ $^{\lor 2}$	2	US Scanarios within the scope of the risk evaluation				
Metric 4:	Temporal Representativeness	High	$\times 2$	2	2015				
Metric 5:	Sample Size	N/A	~ 2	N/A	No Comment.				
		/							
Domain 3: Accessibility/Clar	rity								
Metric 6:	Metadata Completeness	High	$\times 1$	1	Clear documentation of data sources, methods, results and assumptions				
Domain 4: Variability and U	ncortainty								
Motrie 7	Motadata Completeness	High	$\sim 1$	1	deer degumentation of variability and uncertainty				
	metadata Completeness	TIBII	~ 1	1	clear documentation of variability and uncertainty				
Overall Quality Determination <sup><math>\dagger</math></sup>		High		1.0					

Source Citation:2017Type of Data SourceReleaHero ID3860	2017. Pollution prevention search results, envirofacts database. Releases to the Environment; Environmental Release Data; 3860453							
EXTRACTION								
Parameter		Data						
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Annual Release Quantity (kg/yr): Number of Sites: P2 Control & percent Efficiency:			Processing, Use, Disposal Processing, Use, Disposal Total releases for specific facilities, shows previous year and percent re- duction. 51 List pollution prevention info and percent reduction between 2 years					
r 2 Control & percent Enciency.			mon pres	chillon	into and percent reduction between 2 years			
EVALUATION								
Domain	Metric	Rating	$MWF^{\star}$	Score	Comments			
Domain 1: Reliability Metr	ic 1: Methodology	High	× 1	1	EnviroFacts			
Domain 2: Representati	ve							
Metr	ic 2: Geographic Scope	High	$\times 1$	1	US			
Metr	ic 3: Applicability	High	$\times 2$	2	Scenarios within the scope of the risk evaluation			
Metr Metr	ic 4: Temporal Representativeness ic 5: Sample Size	High N/A	$\times 2$	2 N/A	2009-2015 No Comment			
Domain 3: Accessibility/Clarity Metric 6: Metadata Completeness			× 1	2	Povides total release and some P2 information.			
Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness			$\times 1$	3	Just lists data.			
Overall Quality Determination <sup>†</sup>				1.4				

<sup>\*</sup> MWF = Metric Weighting Factor
<sup>†</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.</li>

Source Citation:	U.S, E. P. A. 1992. The toxics release inventory. Hazardous Waste and Hazardous Materials.									
Type of Data Source	Releases to	Releases to the Environment; Environmental Release Data;								
Hero ID	3982118									
EXTRACTION										
Parameter	Data									
Life Cycle Stage:			Diepoes	1						
Life Cycle Descrip	otion (Subca	ategory of Use).	Disposa	1						
Annual Release C	uantity (kg	/vr):	1.092.86	$\frac{1}{52}$ lb/vr						
	,; (8,	, , , , , , , , , , , , , , , , , , , ,	_,,.	75-						
EVALUATION										
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments				
Domain 1. Daliah	:1:4									
Domain 1: Kellad	Motrie 1.	Mathadalagy	Uich	× 1	1					
	metric 1:	Methodology	IIIgli	× 1	1	EPA, 1RI				
Domain 2: Repres	sentative									
*	Metric 2:	Geographic Scope	High	$\times 1$	1	US				
	Metric 3:	Applicability	Low	$\times 2$	6	Unsure what scenario data is for				
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1987-1988				
	Metric 5:	Sample Size	N/A		N/A	No Comment.				
Domain 2. Access	ibiliter /Class	:								
Domain 5: Access	Motrie 6	Motodoto Completeness	Low	× 1	9					
	metric 0:	Metadata Completeness	LOW	× 1	ა	Provides total release for two years				
Domain 4: Variah	oility and Ur	ncertainty								
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	Just lists data.				
Overall Quality Determination <sup><math>\dagger</math></sup>					2.5					

\* MWF = Metric Weighting Factor
<sup>†</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.</li>

Source Citation: Type of Data Source Hero ID	U.S, E. P. Releases to 3986663	U.S, E. P. A 2017. Preliminary Information on Manufacturing, Processing, Distribution, Use, and Disposal: 1,4-Dioxane. Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data; 3986663							
EXTRACTION Parameter			Data						
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Annual Release Quantity (kg/yr): Number of Sites:				Manufacturing, processing, use Manufacturing, processing, use 4,224,670 lbs 25 mfg0 import13 proc21 other uses (2015 TRI)					
EVALUATION		N	D		a				
Domain		Metric	Rating	MWF*	Score	Comments			
Domain 1: Reliab	ility Metric 1:	Methodology	High	$\times 1$	1	EPA Use Dossier			
Domain 2. Benree	sentative								
Domain 2. Repres	Metric 2:	Geographic Scope	High	× 1	1	US			
	Metric 3:	Applicability	High	$\times 2$	2	Scenarios within the scope of the risk evaluation			
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2017			
	Metric 5:	Sample Size	N/A		N/A	No Comment.			
Domain 3: Access	ibility/Clar Metric 6:	ity Metadata Completeness	High	$\times 1$	1	Lists data sources			
Domain 4: Variab	ility and Ur Metric 7:	ncertainty Metadata Completeness	Medium	× 1	2	Limited discussion of variability and uncertainty			
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	High		1.1				

Source Citation: Type of Data Source Hero ID	<ul> <li>N. C. State University. 2017. Identification and reduction of pollution sources in textile wet processing.</li> <li>Releases to the Environment; Environmental Release Data;</li> <li>3986892</li> </ul>								
EXTRACTION									
Parameter			Data						
Life Cycle Stage:			Use						
Life Cycle Descri	ption (Subca	ategory of Use):	Industria	l Use - Te	extiles				
Release or Emissi	ion Factor:		0.65  lb/h	r					
EVALUATION									
Domain		Metric	Rating	$MWF^*$	Score	Comments			
Domain 1: Reliab	oility								
	Metric 1:	Methodology	Medium	$\times 1$	2	Department of Textile ChemistrySchool of TextilesNorth Carolina State University			
Domain 2: Repre	sentative								
*	Metric 2:	Geographic Scope	High	$\times 1$	1	US			
	Metric 3:	Applicability	High	$\times 2$	2	Scenarios within the scope of the risk evaluation			
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1986			
	Metric 5:	Sample Size	N/A		N/A	No Comment.			
Domain 3: Access	sibility/Clar	ity							
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Clear documentation of data sources, methods, results and assumptions			
Domain 4: Varial	oility and U	ncertainty							
	Metric 7:	Metadata Completeness	High	$\times 1$	1	clear documentation of variability and uncertainty			
Overall Quality Determination <sup><math>\dagger</math></sup>			High		1.6				

Source Citation:	Usgs, 200 Refinery n	Usgs, 2002. Geohydrology, Water Quality, and Simulation of Ground-Water Flow in the Vicinity of a Former Waste-Oil Refinery near Westville, Indiana, 1997" 2000								
Type of Data Source Hero ID	Releases to 3827393	Releases to the Environment; Published Models for Exposures or Releases; 3827393								
EXTRACTION										
Parameter			Data							
Life Cycle Stage: Life Cycle Description (Subcategory of Use):			Use Use							
EVALUATION										
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments				
Domain 1, Paliah										
Domain 1. Renau	Metric 1:	Methodology	High	$\times 1$	1	USGS, USDOI, EPA				
	, . <b>.</b>									
Domain 2: Repres	Metric 2.	Geographic Scope	High	× 1	1	IIS				
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	More for fate modeling than releases. Use is for waste-oil re- finery (out of scope)				
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2002				
	Metric 5:	Sample Size	N/A		N/A	No Comment.				
Domain 2. Accord	ibility /Class	:+								
Domain 5. Access	Metric 6:	Metadata Completeness	High	$\times 1$	1	Clear documentation of data sources, methods, results and as- sumptions				
Domain 4: Variah	ility and Ur	acortainty								
	Metric 7:	Metadata Completeness	High	$\times 1$	1	clear documentation of variability and uncertainty				
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	Unacceptable		4.0	Metric Mean Score: 2.0.				

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\* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID	U.S, E. P. Releases to 3970140	U.S, E. P. A 2016. Micro auto gasification system: Emission characterization. Releases to the Environment; Environmental Release Data; 3970140							
EXTRACTION Parameter			Data						
Life Cycle Stage: Life Cycle Description (Subcategory of Use):			Disposal Military waste (out of scope)						
EVALUATION									
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments			
Domain 1: Reliab	ility Metric 1:	Methodology	High	× 1	1	EPA			
Domain 2: Repres	sentative								
Domain 2. Repres	Metric 2:	Geographic Scope	High	$\times 1$	1	US			
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	Release data for military waste (food waste, standard waste, etc). Most dioxane samples non-detect			
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2016			
	Metric 5:	Sample Size	High	$\times 1$	1	8 tests, multiple waste types			
Domain 3: Access	sibility/Clar	ity							
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions			
Domain 4: Variab	oility and Ur	ncertainty							
	Metric 7:	Metadata Completeness	High	$\times 1$	1	clear documentation of variability and uncertainty			
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	Unacceptable		4.0	Metric Mean Score: 1.7.			

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\* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID	European Commission Joint Research, Centre. 2002. Summary risk assessment report: 1,4-Dioxane. Releases to the Environment; Completed Exposure or Risk Assessments; 3970671								
EXTRACTION			Data						
Parameter			Data						
Life Cycle Stage:			Manufacturing, Processing						
Life Cycle Descrip	otion (Subca	tegory of Use):	Manufact	uring, pr	ocessing				
Release or Emission Factor:		Summary of release information from 2002 EU Risk Assessment (HERO ID: 196351)							
EVALUATION									
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments			
Domain 1. Beliah	ility								
	Metric 1:	Methodology	High	$\times 1$	1	European Chemicals Bureau			
Domain 2: Repres	sentative								
	Metric 2:	Geographic Scope	Medium	$\times 1$	2	EU			
	Metric 3:	Applicability	High	$\times 2$	2	Scenarios within the scope of the risk evaluation			
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2002			
	Metric 5:	Sample Size	N/A		N/A	No Comment.			
Domain 3: Access	sibility/Clar	ity							
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Clear documentation of data sources, methods, results and as- sumptions			
Domain 4: Variat	vility and Ur	ncertainty							
	Metric 7:	Metadata Completeness	High	$\times 1$	1	clear documentation of variability and uncertainty			
Overall Quality Determination <sup>†</sup>			High		1.4				

Source Citation:	U.S. E. P. A. 1990. Madison County Sanitary Landfill: 1998 Northeast Rocky Ford Rd (County Rd 591): Madison, FL: County: Madison, District: Northeast: Site Load: EPA: HWC# 076							
Type of Data Source Hero ID	Releases to 3982214	the Environment; Reports for	Data or Inf	ormation	# 070. Other	than Exposure or Release Data;		
EXTRACTION								
Parameter			Data					
Life Cycle Stage:			Disposal					
Life Cycle Descrip	otion (Subce	ategory of Use).	uncertain					
Disposal /Treatm	ent Method	:	landfill					
Release or Emissi	on Factor:		more than	n 3.2 ug/	L prese	nt in onsite extraction wells		
P2 Control & per	cent Efficier	ncy:	neeed to	put in ne	w treat	ment system that can treat dioxane		
				L				
EVALUATION								
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments		
Danain 1. Daliah	:1:							
Domain 1: Reliad	Motrie 1.	Mathadalagy	Uich	× 1	1			
	metric 1:	Methodology	Ingn	× 1	1	EPA		
Domain 2: Repres	sentative							
	Metric 2:	Geographic Scope	High	$\times 1$	1	US		
	Metric 3:	Applicability	Medium	$\times 2$	4	Disposal, but missing a lot of useful information		
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2016		
	Metric 5:	Sample Size	N/A		N/A	No Comment.		
Domain 3: Access	sibility/Clar	ity	NT / A		NT / A			
	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.		
Domain 4: Variat	oility and U	ncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.		
		*	/		'			
Overall Quality Determination <sup>†</sup>		High		1.3				
		0		-				

<sup>\*</sup> MWF = Metric Weighting Factor
<sup>†</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.</li>

## PEER REVIEW DRAFT, DO NOT CITE OR QUOTE

Source Citation:	U.S, E. P. A., 1986. Peak Oil-Bay Drum Company: State Rd 574 and Faulkenburg Rd: Tampa, FL: County: Hillsborough: District: Southwest: Site lead: EPA HWC# 021								
Type of Data Source Hero ID	Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data; 3982213								
EXTRACTION									
Parameter	Data								
Life Cycle Stage			Disposal						
Life Cycle Descript	tion (Subca	ategory of Use):	Disposal						
Release Source:	,		Drum Recyclin	g, then a	ı deposi	tory for roofing shingles and construction			
	<b>D</b> (		debris	· ·	•,	. 11			
Release or Emission Factor:			Up to 390 ug/1	∟ ın area	monito	ring wells			
EVALUATION									
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments			
Domain 1. Reliabi	lity								
	Metric 1:	Methodology	High	$\times 1$	1	EPA			
Domain 2: Represe	entative								
Domain 2. Ropros	Metric 2:	Geographic Scope	High	× 1	1	US			
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	Releases related to 1,1,1-TCA, out of scope			
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2016			
	Metric 5:	Sample Size	Low	$\times 1$	3	2 samples			
Domain 3: Accessi	ibility/Clari	ity							
	Metric 6:	Metadata Completeness	Low	$\times 1$	3	only gives one data point			
Domain 4: Variabi	lity and U	acortainty							
Domain 4. variabi	Metric 7:	Metadata Completeness	Low	× 1	3	no discussion			
Overall Quality De	eterminatio	$n^{\dagger}$	Unacceptable		4.0	Metric Mean Score: 2.3.			

\*\* Consistent with our Application of Systematic Review in TSCARisk Evaluations document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

\* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID	Nc, Denr. Releases to 3982112	Nc, Denr. 1995. Case study: Hoechst Celanese Corporation. Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data; 3982112							
EXTRACTION Parameter			Data						
Life Cycle Stage: Life Cycle Description (Subcategory of Use):		Use Textiles							
EVALUATION									
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments			
Domain 1: Reliab	ility Metric 1:	Methodology	High	× 1	1	NCDENR			
Domain 2: Repres	sentative Metric 2: Metric 3:	Geographic Scope Applicability	High Unacceptable	$\times 1$ $\times 2$	1 8	US Releases related to 1,1,1-TCA, out of scope			
	Metric 4: Metric 5:	Temporal Representativeness Sample Size	Low N/A	$\times 2$	6 N/A	1995 No Comment.			
Domain 3: Access	ibility/Clar Metric 6:	ity Metadata Completeness	N/A		N/A	No Comment.			
Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness		N/A		N/A	No Comment.				
Overall Quality Determination <sup>†</sup>			Unacceptable		4.0	Metric Mean Score: 2.7.			

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\* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID	U.S, E. P. Releases to 3982106	U.S, E. P. A., 1995. 1995 Toxics release inventory public data release overview. Releases to the Environment; Environmental Release Data; 3982106							
EXTRACTION									
Parameter			Data						
Life Cycle Stage:			Manufact	Manufacturing, processing, and use					
Life Cycle Descri	ption (Subca	ategory of Use):	All stages	3		-			
Release or Emissi	on Factor:		TRI relea	ses from	1995				
EVALUATION									
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments			
Domain 1: Reliab	oility								
	Metric 1:	Methodology	High	$\times 1$	1	EPA			
Domain 2: Repre	sentative								
	Metric 2:	Geographic Scope	High	$\times 1$	1	US			
	Metric 3:	Applicability	High	$\times 2$	2	TRI data include occupational scenarios within scope, al- though data not broken down by sites or industries.			
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1995			
	Metric 5:	Sample Size	High	$\times 1$	1	TRI Sites			
Domain 3: Access	sibility/Clar	ity							
	Metric 6:	Metadata Completeness	Low	× 1	3	TRI data only include release media; no other metadata included.			
Domain 4: Variat	ility and U	ncertainty							
	Metric 7:	Metadata Completeness	High	$\times 1$	1	clear documentation of variability and uncertainty			
Overall Quality Determination <sup>†</sup>		Medium		1.7					

Source Citation: Type of Data Source Hero ID	Sherry, S., Releases to 3982107	Sherry, S.,Belliveau, M.,Donegan, D.,Gianolini, K.,Sivas, D 1985. High tech and toxics: A guide for local communities. Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data; 3982107							
EXTRACTION Parameter			Data						
Life Cycle Stage: Release Source:			Disposal BASF facility	in Bedofr	d, MA				
EVALUATION									
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments			
Domain 1: Reliab	ility Metric 1:	Methodology	Medium	$\times 1$	2	Golden Empire Health Planning Center			
Domain 2: Repres	sentative								
	Metric 2:	Geographic Scope	High	$\times 1$	1	US			
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	Does not provide engineering information. More relevant for community exposures			
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1985			
	Metric 5:	Sample Size	N/A		N/A	No Comment.			
Domain 3: Access	sibility/Clar	ity							
	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.			
Domain 4: Variab	oility and Ur Metric 7:	ncertainty Metadata Completeness	N/A		N/A	No Comment.			
Overall Quality D	Determinatio	n <sup>†</sup>	Unacceptable		4.0	Metric Mean Score: 2.8.			

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\* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID	U.S, E. P. A. 1993. Categories of released chemicals reported to the Toxic Release Inventory: 1990 data. Releases to the Environment; Environmental Release Data; 3982108								
EXTRACTION			Data						
			Data						
Life Cycle Stage:			Manufact	uring, pr	ocessing	g, and use			
Life Cycle Descrip	ption (Subca	ategory of Use):	All stages	;					
Release or Emissi	on Factor:		TRI relea	TRI releases from 1990					
EVALUATION									
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments			
Domain 1: Reliab	ility Metric 1:	Methodology	High	× 1	1	EPA			
		monodology	111.511	<u> </u>	-				
Domain 2: Repres	sentative								
	Metric 2:	Geographic Scope	High	$\times 1$	1	US			
	Metric 3:	Applicability	High	$\times 2$	2	TRI data include occupational scenarios within scope.			
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1990			
	Metric 5:	Sample Size	High	$\times 1$	1	TRI Sites			
Domain 3: Access	sibility/Clar	ity							
	Metric 6:	Metadata Completeness	Low	$\times 1$	3	TRI data only include release media; no other metadata included.			
Domain 4: Variat	vility and U	acortainty							
Domain 4. Vallat	Metric 7:	Metadata Completeness	High	$\times 1$	1	clear documentation of variability and uncertainty			
Overall Quality D	Determinatio	$\mathrm{n}^\dagger$	Medium		1.7				

Source Citation:	Sapphire, Group. 2007. Voluntary Children's Chemical Evaluation Program [VCCEP]. Tiers 1, 2, and 3 Pilot Submission For 1.4-Dioyane									
Type of Data Source Hero ID	Releases to 3809038	Releases to the Environment; Completed Exposure or Risk Assessments; 3809038								
EXTRACTION Parameter		Data								
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Release or Emission Factor: Annual Release Quantity (kg/yr): Number of Sites:			Manufacturing, processing, and use All stages 233,349 lb. wasreleased directly to the environment (38.4 percent to water, 49.3 percent to air and 12.4 percent to land) 821,067 lbs (2004) 51							
<b>EVALUATION</b> Domain		Metric	Rating	MWF*	Score	Comments				
Domain 1: Reliab	ility Metric 1:	Methodology	Medium	× 1	2	Ferro Corp submission for VCCEP				
Domain 2: Repres	sentative									
	Metric 2:	Geographic Scope	High	$\times 1$	1	US				
	Metric 3:	Applicability	High	$\times 2$	2	TRI data include occupational scenarios within scope, al- though data not broken down by sites or industries.				
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2007				
	Metric 5:	Sample Size	High	$\times 1$	1	TRI Sites				
Domain 3: Access	sibility/Clar Metric 6:	ity Metadata Completeness	Low	× 1	3	TRI data only include release media; no other metadata in- cluded.				
Domain 4: Variab	ility and Uı Metric 7:	ncertainty Metadata Completeness	High	$\times 1$	1	clear documentation of variability and uncertainty				
Overall Quality Determination <sup>†</sup>			High		1.6	· · ·				

Occupational Exposure

Source Citation:Niosh,. 1977. Criteria for a recommended standard occupational exposure to dioxane.Type of Data SourceOccupational Exposure; Reports for Data or Information Other than Exposure or Release Data;Hero ID62937								
EXTRACTION Parameter		Data						
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Physical Form: Exposure Concentration (Unit): Number of Sites: Number of Workers: Exposure Duration:			Manufacture Manufacture of Dioxane Liquid 1,000 - 2,000 ppm200 - 300 ppm 4 2,500 in the US exposed (not including 1,1,1-trichloroethane mfg) 3-5 min15 min					
EVALUATION Domain	Metric	Rating	$MWF^{\star}$	Score	Comments			
Domain 1: Reliability Metric 1:	Methodology	High	$\times 1$	1	NIOSH report			
Domain 2: Representative Metric 2: Metric 3: Metric 4:	Geographic Scope Applicability Temporal Representativeness	High Medium Low	$\times 1$ $\times 2$ $\times 2$	$ \begin{array}{c} 1\\ 4\\ 6\end{array} $	US occupational scenario within the scope of the risk evaluation - "exposure data" is from toxicology studies, not worker expo- sure during manufacture 1977			
Metric 5:	Sample Size	N/A	~ 2	N/A	No Comment.			
Domain 3: Accessibility/Clar Metric 6:	ity Metadata Completeness	High	$\times 1$	1	Assessment or report clearly documents its data sources, as- sessment methods, results, and assumptions.			
Domain 4: Variability and U Metric 7:	ncertainty Metadata Completeness	High	$\times 1$	1	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized			
Overall Quality Determination	Medium		1.8					

<sup>\*</sup> MWF = Metric Weighting Factor
<sup>†</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.</li>

Source Citation:Nicnas, 1998. 1, 4-Dioxane. Priority existing chemical assessment report No. 7.Type of Data SourceOccupational Exposure; Completed Exposure or Risk Assessments;								
Hero ID 3827412								
EXTRACTION								
Parameter		Data						
		~						
Life Cycle Stage:		Commercial Use						
Life Cycle Description (Subca	tegory of Use):	Lab use	C 1					
Physical Form:		Not specified						
Route of Exposure:	L).	Innalation						
Exposure Concentration (Unit	b):	1.8 ppm (highest)						
Worker Activity	100:	1 WA	TWA advant autoration and TLC					
Type of Sampling:		porsonal y	nonitorir	anu 11				
Engineering Control & percen	t Exposure Beduction:	film cuph	oards/ho	ng ods dil	ution ventilation			
Engineering Control & percent Exposure Reduction.			our us/ no	ous, un				
EVALUATION								
Domain	Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments			
Domain 1: Beliability								
Metric 1:	Methodology	High	$\times 1$	1	NICNAS			
Domain 2. Poprogentative								
Motria 2:	Coographic Scope	Modium	$\sim 1$	2	Assetselie			
Metric 2.	Applicability	High	$\times 1$ $\times 2$	2	Australia			
Metric 4:	Temporal Bepresentativeness	Medium	$^{\sim 2}$ $\times 2$	2 4	1008			
Metric 5:	Sample Size	N/A	× 2	N/A	N/A. Assessment uses modeling to estimate occupational exposures; report does not include any monitoring data.			
Domain 5: Accessibility/Clari	Votadata Completeness	Uich	× 1	1				
metric 6:	Metadata Completeness	nign	× 1	1	Clear documentation of data sources, methods, results and as- sumptions			
Domain 4: Variability and Un	certainty							
Metric 7	Metadata Completeness	Medium	× 1	2	Limited discussion of variability and uncertainty			
		moarani		-	accussion of randomy and uncervality			
Overall Quality Determination	n†	High		1.5				
- •		-						

\* MWF = Metric Weighting Factor
 † If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.</li>

Source Citation: Type of Data Source Hero ID	Nicnas, 1998. 1, 4-Dioxane. Priority existing chemical assessment report No. 7. Occupational Exposure; Completed Exposure or Risk Assessments; 3827412								
EXTRACTION Parameter			Data						
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Physical Form: Route of Exposure: Exposure Concentration (Unit): Type of Measurement or Method: Worker Activity: PPE:				Commercial, potential consumer use Film Cement Not specified Inhalation <1ppm pbz Film cement application No PPE used					
<b>EVALUATION</b> Domain		Metric	Rating	MWF*	Score	Comments			
Domain 1: Reliab	ility Metric 1:	Methodology	High	× 1	1	NICNAS			
Domain 2: Repres	Sentative Metric 2: Metric 3: Metric 4: Metric 5: Sibility/Clar: Metric 6:	Geographic Scope Applicability Temporal Representativeness Sample Size ity Metadata Completeness	Medium High Medium N/A High	$\begin{array}{c} \times 1 \\ \times 2 \\ \times 2 \end{array}$ $\times 1$	2 2 4 N/A	Australia occupational scenario within the scope of the risk evaluation 1998 N/A. Assessment uses modeling to estimate occupational ex- posures; report does not include any monitoring data. Clear documentation of data sources, methods, results and as- sumptions			
Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness		Medium	× 1	2	Limited discussion of variability and uncertainty				
Overall Quality Determination <sup>†</sup>			High		1.5				

Source Citation: Type of Data Source Hero ID	ToxNet Hazardous Substances Data, Bank. 2017. HSDB: 1,4-Dioxane. Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data; 3970270							
EXTRACTION			Data					
Parameter			Data					
Life Cycle Stage:			Industrial	l Use				
Physical Form:			Not speci	fied				
Route of Exposur	e:		Inhalatio	n, dermal	1	.1		
Number of Worke	ers:		50-99 per plant429,330 in the US					
EVALUATION								
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments		
Domain 1: Reliab	ility							
	Metric 1:	Methodology	High	$\times 1$	1	2012 TSCA IUR Data (per plant data), NIOSH NOES (Total worker data)		
Domain 2: Repres	sentative							
Domain = Teopro	Metric 2:	Geographic Scope	High	$\times 1$	1	US		
	Metric 3:	Applicability	High	$\times 2$	2	Industrial Use		
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	NIOSH NOES from 1981-1983		
	Metric 5:	Sample Size	Medium	× 1	2	2012 TSCA IUR Data (per plant data), NIOSH NOES (Total worker data)		
Domain 3. Access	vibility/Clar	itv						
Domain 5. Access	Metric 6:	Metadata Completeness	High	$\times 1$	1	Clear documentation of data sources, methods, results and as- sumptions		
$\mathbf{D}$ : $\mathbf{A}\mathbf{V}$ : 1								
Domain 4: Variat	Metric 7:	Metadata Completeness	Low	$\times 1$	3	No discussion/not applicable		
Overall Quality Determination <sup>†</sup>		Medium		1.8				

Source Citation: Type of Data Source Hero ID	<ul> <li>Hhs, 1978. Occupational health guideline for dioxane.</li> <li>Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data; 3978118</li> </ul>								
EXTRACTION Parameter			Data						
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Physical Form: Engineering Control & percent Exposure Reduction:				Industrial Use Textile processing; Wood pulping; Histology; Scintillation Not specified Textile processing, Wood pulping: Local exhaust ventilation, general di- lution ventilationHistology: local exhaust ventilationScintillation: Gen- eral dilution ventilation					
<b>EVALUATION</b> Domain		Metric	Rating	$MWF^{\star}$	Score	Comments			
Domain 1: Reliabil	lity Metric 1:	Methodology	High	$\times 1$	1	NIOSH and OSHA			
Domain 2: Represe	entative								
	Metric 2: Metric 3:	Geographic Scope Applicability	High High	$\times 1 \times 2$	$\frac{1}{2}$	US Wetting and dispersing agent in textiles, wood pulping, prepa- ration of histological samples, and liquid scintillation medium			
	Metric 4: Metric 5:	Temporal Representativeness Sample Size	Low N/A	$\times 2$	$_{ m N/A}^{ m 6}$	1978 N/A - no sampling data			
Domain 3: Accessi	bility/Clari Metric 6:	ity Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and as- sumptions			
Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness		Low	$\times 1$	3	No discussion/not applicable				
Overall Quality Determination <sup><math>\dagger</math></sup>		Medium		1.8					

Source Citation: Type of Data Source Hero ID	Carex, Canada. 2017. Profiles & estimates: 1,4-Dioxane. Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data; 3978382							
EXTRACTION Parameter			Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Physical Form: Route of Exposure: Exposure Concentration (Unit): Type of Measurement or Method: Worker Activity: Number of Workers:			Industrial Use Packaging final products Not specified Inhalation 40 mg/m3 European Model Mixing and bagging final products 3,600 Canadians exposed in the workplace					
<b>EVALUATION</b> Domain		Metric	Rating	MWF*	Score	Comments		
Domain 1: Reliab	ility Metric 1:	Methodology	High	× 1	1	CAREX Canada		
Domain 2: Representative Metric 2: Geographic Scope Metric 3: Applicability Metric 4: Temporal Representativeness Metric 5: Sample Size		Medium High High N/A	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \end{array}$	2 2 2 N/A	Canada Industrial Use 2016 N/A - no sampling data			
Domain 3: Access	sibility/Clar Metric 6:	ity Metadata Completeness	Medium	× 1	2	Mentions a "European occupational exposure assessment" for the models, but doesn"t specify the assessment or the models		
Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness		Low	$\times 1$	3	No discussion/not applicable			
Overall Quality Determination <sup>†</sup>		High		1.5				

Source Citation: Type of Data Source Hero ID	Carex, Ca Occupatio 3978383	Carex, Canada. 2017. 1,4-Dioxane– Occupational Estimate. Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data; 3978383							
EXTRACTION Parameter			Data						
Life Cycle Stage: Physical Form: Number of Worke	Cycle Stage: sical Form: nber of Workers:				Industrial Use Not specified Basic Chem MFG - 200Plastic product MFG - 200				
EVALUATION									
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments			
Domain 1: Reliab	ility Metric 1:	Methodology	High	$\times 1$	1	CAREX Canada			
			0						
Domain 2: Repre	Metric 2.	Geographic Scope	Medium	× 1	9	Canada			
	Metric 3:	Applicability	High	$\times 2$	$\frac{2}{2}$	Industrial Use			
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2017			
	Metric 5:	Sample Size	N/A		N/A	N/A - no sampling data			
Domain 3: Access	sibility/Clar	ity							
Domain 9. Treees	Metric 6:	Metadata Completeness	Medium	$\times 1$	2	Assessment or report clearly documents results, methods, and assumptions. Data sources are generally described but not fully transparent.			
Demois 4. Veriel	:1:4 J TI-	· · · · · · · · · · · · · · · · · · ·							
Domain 4: Variat	Metric 7:	Metadata Completeness	Low	$\times 1$	3	The assessment does not address variability or uncertainty.			
Overall Quality	Determinatio	$\mathbf{n}^{\dagger}$	High		1.5				

Source Citation:	Buffler, P. A., Wood, S. M., Suarez, L., Kilian, D. J 1978. Mortality follow-up of workers exposed to 1,4-dioxane. Journal of Occupational and Environmental Medicine								
Type of Data Source Hero ID	Occupation 62914	nal Exposure; Monitoring Data;	•						
EXTRACTION			<b>D</b> /						
Parameter			Data						
Life Cycle Stage:			Manufacturing						
Physical Form:			Not spe	cified					
Route of Exposure	e:		Inhalati	on					
Exposure Concent	tration (Uni	it):	< 25  pp	< 25  ppm (estimation)					
Number of Sites:			1						
Worker Activity:			Describ operation loading equipment	es expos ons in op operator ent	ure to t pen-air p rs (to ta	hree groups - 1) control operators who monitor plant from enclosed room, also take samples; 2) ank cars); 3) maintenance personnel who repair			
Number of Workers:				100					
EVALUATION									
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments			
Domain 1: Beliab	ility								
	Metric 1:	Methodology	High	$\times 1$	1	Journal of Occupational Medicine, trusted source			
Domain 2: Repres	entative								
-	Metric 2:	Geographic Scope	High	$\times 1$	1	US			
	Metric 3:	Applicability	High	$\times 2$	2	direct occupational scenario			
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1978			
	Metric 5:	Sample Size	High	$\times 1$	1	Full characterization			
Domain 3: Access	ibility/Clar	ity							
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Clear documentation of data sources, methods, results and as- sumptions			
Domain 4: Variab	ility and U	ncertainty							
	Metric 7:	Metadata Completeness	High	$\times 1$	1	clearly documented			
Overall Quality D	eterminatio	n <sup>†</sup>	High		1.4				
Continued on next page									

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Source Citation:	Buffler, P. A., Wood, S. M., Suarez, L., Kilia Occupational and Environmental Medicine	an, D. J	1978. M	fortality follow	-up of workers exposed to 1,4-dioxane. Journal of
Type of Data Source	Occupational Exposure; Monitoring Data;				
Hero ID	62914				
EVALUATION					
Domain	Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments

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\* MWF = Metric Weighting Factor

Source Citation:	Buffler, P. A., Wood, S. M., Suarez, L., Kilian, D. J., 1978. Mortality follow-up of workers exposed to 1,4-dioxane. Journal Occupational and Environmental Medicine							
Type of Data Source	Occupational Exposure; Monitoring Data;							
Hero ID	62914							
EXTRACTION								
Parameter			Data					
Life Cycle Stager			Drogogg	ing				
Physical Form:			Not spe	cified				
Route of Exposur	e:		inhalati	on				
Exposure Concent	tration (Uni	t):	< 25  pp	om (estin	nation)			
Number of Sites:	<b>`</b>	,	1		,			
Worker Activity:			Dioxane	e process	ing subi	unit within vinyl-chloride vinyldiene department		
Number of Worke	rs:		65					
EVALUATION								
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments		
Domain 1: Reliab	ility							
Domain 1. Honab	Metric 1:	Methodology	High	$\times 1$	1	Journal of Occupational Medicine, trusted source		
	_							
Domain 2: Repres	sentative			-	-			
	Metric 2:	Geographic Scope	High	$\times 1$	1	US		
	Metric 3:	Applicability	High	$\times 2$	2	direct occupational scenario		
	Metric 4:	Composal Representativeness	LOW	× 2	0	1978 E. H. J.		
	metric 5:	Sample Size	підп	X 1	1	Full characterization		
Domain 3: Access	sibility/Clar	ity						
20111111 0. 110000	Metric 6:	Metadata Completeness	High	$\times 1$	1	Clear documentation of data sources, methods, results and as-		
		*	0			sumptions		
Domain 4. V	ilitar and T	a containte						
Domain 4: Variat	Motrie 7	Metadata Completeness	Ujeh	× 1	1			
	Metric 7.	Metadata Completeness	Ingn	× 1	1	clearly documented		
Overell Oveliter D	otorminatio	n†	High		14			
Overall Quality D	eterminatio	11.	nıgırı		1.4			

Source Citation:	Jezewska, A., SzewczyÅska, M., WoÅ <sup>o</sup> nica, A. 2014. [Occupational exposure to airborne chemical substances in paintings conservators]. Medvcvna Pracy.						
Type of Data Source	Occupation	nal Exposure; Monitoring Data;					
Hero ID	2539080						
EXTRACTION							
Parameter			Data				
Life Cruele Stame			Uas				
Life Cycle Stage:	tion (Subas	tomory of Uco).	Use Dointing Studi	~			
Physical Form		ttegory of Use).	Vapor	0			
Route of Exposur	e.		inhalation				
Exposure Concent	tration (Uni	t):	110  to  1.055  m	ng∕m3 de	pending	r on activity	
Number of Sampl	es:	-)-	5	-8/	I		
Number of Sites:			2				
Type of Measuren	nent or Met	hod:	GC-FID				
Worker Activity:			cleaning of the	frame, o	leaning	of image	
Type of Sampling	:		Sampling tube	, method	ls listed		
EVALUATION							
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments	
Domain 1, Paliah	;1;+						
Domain 1. Kenab	Motric 1.	Mathadalagy	Modium	$\sim 1$	9	OFCD course OFCD notions currented to use acceptable	
	Meene 1.	Methodology	Medium	~ 1	2	methods.	
Domain 9. Donna	antatina						
Domain 2: Repres	Motria 2.	Coographic Scope	Modium	$\vee 1$	9	OECD Deland	
	Metric 3:	Applicability	Unaccentable	$^{\wedge 1}$	2 8	Out of scope	
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2014	
	Metric 5:	Sample Size	Low	× 1	3	Unclear - most of paper is not in English	
		*					
Domain 3: Access	bility/Clari	ity					
	Metric 6:	Metadata Completeness	Unacceptable	$\times 1$	4	Most of paper is not in English; therefore, needed metadata are not provided.	
Damain 4. W 11	:1:4						
Domain 4: Variab	Matuia 7	Metalata Canadatar	Τ	<b>1</b>	9		
	metric /:	Metadata Completeness	LOW	× 1	3	Unclear - most of paper is not in English	
		C	Continued on nex	t page			

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Source Citation:	Jezewska, A.,SzewczyÅska, M.,WoÅ <sup>o</sup> nica, conservators]. Medycyna Pracy.	A 2014. [Oce	cupationa	al expos	sure to airborne chemical substances in paintings			
Type of Data Source	e of Data Source Occupational Exposure; Monitoring Data;							
Hero ID	2539080							
EVALUATION								
Domain	Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments			
Overall Quality I	$Petermination^{\dagger}$	Unacceptable		4.0	Metric Mean Score: 2.7.			

\*\* Consistent with our Application of Systematic Review in TSCARisk Evaluations document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, two of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

\* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID	2017. Chemical data reporting: 1,4-Dioxane. Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data; 3860451							
EXTRACTION								
Parameter			Data					
Life Cycle Stage: Physical Form: Number of Sites: Number of Worke	arc.		Manufact liquid 1 50 to 99	uring				
Tumber of Worke			00 10 55					
EVALUATION								
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments		
Domain 1: Reliab	oility Metric 1:	Methodology	High	$\times 1$	1	US EPA CDR, trusted source		
Domain 2. Panna	aantatiwa							
Domain 2. Repres	Motric 2.	Geographic Scope	High	$\times 1$	1	IIG		
	Metric 3:	Applicability	High	$\times 1$ $\times 2$	2	occupational scenario within the scope of the risk evaluation		
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2017		
	Metric 5:	Sample Size	Medium	× 1	2	Distribution of samples is characterized by a range with uncer- tain statistics. It is unclear if analysis is representative.		
Domain 3: Access	sibility/Clar	ity	т	1	9			
	Metric 6:	Metadata Completeness	Low	× 1	3	CDR Site data - underlying methods, sources, assumptions not transparaent		
Domain 4: Variab	bility and Un Metric 7:	ncertainty Metadata Completeness	Low	× 1	3	No discussion/not applicable		
			101	<u>^ +</u>				
Overall Quality I	Determinatio	n†	High		1.6			

<sup>\*</sup> MWF = Metric Weighting Factor
 <sup>†</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.</li>

Source Citation: Type of Data Source Hero ID	U.S, E. P. A 2015. TSCA work plan chemical problem formulation and initial assessment. 1,4-Dioxane. Occupational Exposure; Completed Exposure or Risk Assessments; 3809027							
EXTRACTION								
Parameter			Data					
Life Cycle Stage:			Manufact	uring				
Physical Form:			Vapor	_				
Route of Exposur	e:		Inhalation	n				
Exposure Concent	tration (Uni	it):	TWA: typ	pical - $0.2$	2  mg/m	3; worst case $10  mg/m3$		
Type of Measurer	nent or Met	hod:	TWA					
EVALUATION								
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments		
Domain 1. Reliab	ility							
Domain 1. Renad	Metric 1:	Methodology	High	$\times 1$	1	TSCA Work Plan Chemical		
Demoir 9. Demo								
Domain 2: Repres	Motrie 2:	Coographic Scope	High	$\vee$ 1	1	TIC .		
	Metric 2.	Applicability	High	$\times 1$ $\times 2$	2	US		
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2015		
	Metric 5:	Sample Size	Medium	$\times 1$	2	Distribution of samples is characterized by a range with uncer- tain statistics. It is unclear if analysis is representative.		
Domain 3: Access	ibility/Clar	ity						
Domain 5. Access	Metric 6:	Metadata Completeness	High	$\times 1$	1	Clear documentation of data sources, methods, results and as- sumptions		
Domain 4: Variah	ility and U	ncortainty						
	Metric 7:	Metadata Completeness	High	$\times 1$	1	clearly documented - this data point exists within a range (see other data from this source)		
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	High		1.1			

Source Citation: Type of Data Source Hero ID	U.S, E. P. Occupation 3809027	A.: 2015. TSCA work plan cher nal Exposure; Completed Expos	nical proble ure or Risk	em formu Assessm	lation a ents;	and initial assessment. 1,4-Dioxane.
EXTRACTION Parameter			Data			
Life Cycle Stage: Physical Form: Route of Exposure: Exposure Concentration (Unit): Type of Measurement or Method:			Processing Vapor Inhalation TWA: typical - 40 mg/m3; worst case 180 mg/m3 TWA			
<b>EVALUATION</b> Domain		Metric	Rating	MWF*	Score	Comments
Domain 1: Reliab	ility Metric 1:	Methodology	High	× 1	1	TSCA Work Plan Chemical
Domain 2: Repres	sentative Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3: Metric 4:	Applicability Temporal Representativeness	High High	$\times 2 \times 2$	$\frac{2}{2}$	occupational scenario within the scope of the risk evaluation 2015
	Metric 5:	Sample Size	Medium	× 1	2	Distribution of samples is characterized by a range with uncer- tain statistics. It is unclear if analysis is representative.
Domain 3: Access	ibility/Clar Metric 6:	ity Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and as- sumptions
Domain 4: Variab	ility and Un Metric 7:	ncertainty Metadata Completeness	High	× 1	1	clearly documented - this data point exists within a range (see other data from this source)
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	High		1.1	

Source Citation:U.SType of Data SourceOccHero ID3809	, E. P. upatio 9027	A 2015. TSCA work plan cher nal Exposure; Completed Expos	mical proble ure or Risk	em formu Assessm	llation a ents;	and initial assessment. 1,4-Dioxane.
EXTRACTION Parameter			Data			
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Physical Form: Route of Exposure: Exposure Concentration (Unit): Type of Measurement or Method:			Use Cleaning agent Vapor Inhalation TWA: typical - 15 mg/m3; worst case 50 mg/m3 TWA			
<b>EVALUATION</b> Domain		Metric	Rating	MWF*	Score	Comments
Domain 1: Reliability Met	oric 1:	Methodology	High	× 1	1	TSCA Work Plan Chemical
Domain 2: Representa Met Met Met	tive pric 2: pric 3: pric 4: pric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	High High High Medium	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \\ \times \ 1 \end{array}$	1 2 2 2	US occupational scenario within the scope of the risk evaluation 2015 Distribution of samples is characterized by a range with uncer- tain statistics. It is unclear if analysis is representative.
Domain 3: Accessibility Met	y/Clar cric 6:	ity Metadata Completeness	High	$\times 1$	1	Clear documentation of data sources, methods, results and as- sumptions
Domain 4: Variability Met	and U: oric 7:	ncertainty Metadata Completeness	High	$\times 1$	1	clearly documented - this data point exists within a range (see other data from this source)
Overall Quality Determination <sup><math>\dagger</math></sup>		High		1.1		

Source Citation:U.S, E. PType of Data SourceOccupationHero ID3809027	. A 2015. TSCA work plan cher onal Exposure; Completed Expos	mical proble sure or Risk	em formu Assessm	ulation a lents;	and initial assessment. 1,4-Dioxane.
EXTRACTION Parameter		Data			
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Physical Form: Route of Exposure: Exposure Concentration (Unit): Type of Measurement or Method:		Use Paint Vapor Inhalation TWA: typical - 2 mg/m3; worst case 11 mg/m3 TWA			
<b>EVALUATION</b> Domain	Metric	Rating	MWF*	Score	Comments
Domain 1: Reliability Metric 1:	Methodology	High	× 1	1	TSCA Work Plan Chemical
Domain 2: Representative Metric 2: Metric 3: Metric 4: Metric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	High High High Medium	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \\ \times \ 1 \end{array}$	$\begin{array}{c}1\\2\\2\\2\end{array}$	US occupational scenario within the scope of the risk evaluation 2015 Distribution of samples is characterized by a range with uncer- tain statistics. It is unclear if analysis is representative.
Domain 3: Accessibility/Cla Metric 6:	rity Metadata Completeness	High	$\times 1$	1	Clear documentation of data sources, methods, results and as- sumptions
Domain 4: Variability and U Metric 7:	Incertainty Metadata Completeness	High	$\times 1$	1	clearly documented - this data point exists within a range (see other data from this source)
Overall Quality Determinati	$\mathrm{on}^\dagger$	High		1.1	

Source Citation:U.S, E. PType of Data SourceOccupationHero ID3809027	. A 2015. TSCA work plan cher onal Exposure; Completed Expos	mical proble sure or Risk	em formu Assessm	ulation a ents;	and initial assessment. 1,4-Dioxane.
EXTRACTION Parameter		Data			
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Physical Form: Route of Exposure: Exposure Concentration (Unit): Type of Measurement or Method:		Use Lab Solvent Vapor Inhalation TWA: typical - 5 mg/m3; worst case 25 mg/m3 TWA			
<b>EVALUATION</b> Domain	Metric	Rating	MWF*	Score	Comments
Domain 1: Reliability Metric 1:	Methodology	High	× 1	1	TSCA Work Plan Chemical
Domain 2: Representative Metric 2: Metric 3: Metric 4: Metric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	High High High Medium	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \\ \times \ 1 \end{array}$	$\begin{array}{c} 1\\ 2\\ 2\\ 2\end{array}$	US occupational scenario within the scope of the risk evaluation 2015 Distribution of samples is characterized by a range with uncer- tain statistics. It is unclear if analysis is representative.
Domain 3: Accessibility/Cla Metric 6:	rity Metadata Completeness	High	$\times 1$	1	Clear documentation of data sources, methods, results and as- sumptions
Domain 4: Variability and U Metric 7:	Incertainty Metadata Completeness	High	$\times 1$	1	clearly documented - this data point exists within a range (see other data from this source)
Overall Quality Determination	$\mathrm{on}^\dagger$	High		1.1	

Source Citation:U.S, E. P.Type of Data SourceOccupationHero ID3970070	A 2017. Information on the vanal Exposure; Reports for Data	arious spra or Inform	ay polyu ation Ot	rethane her tha	foam products. n Exposure or Release Data;	
EXTRACTION Parameter		Data				
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Physical Form: Route of Exposure: Worker Activity: Engineering Control & percent Exposure Reduction:		Use Spray polyurethane foam Aerosol, Vapor, Dust Inhalation, dermal " During application " After application " During heat-generating pro- cesses such as drilling, welding, or sanding " During fires -Ventilation and contianment practices-Special procedures for permit re-				
PPE:		<ul> <li>- ventration and contrainment practices-Special procedures for permit required confined spaces</li> <li>- 2 Component HP: Supplied air respirator, eye protection, chemical resistant clothing and gloves- 2-Component LP: Air purifying respirator, eye protection, chemical resistant clothing and gloves- OCF: eye protection, chemical resistant clothing and gloves</li> </ul>			pplied air respirator, eye protection, chemical re- ves- 2-Component LP: Air purifying respirator, resistant clothing and gloves- OCF: eye protec- clothing and gloves	
EVALUATION Domain	Metric	Rating	MWF*	Score	Comments	
Domain 1: Reliability Metric 1:	Methodology	High	× 1	1	EPA	
Domain 2: Representative						
Metric 2:	Geographic Scope	High	$\times 1$	1	US	
Metric 3:	Applicability	High	$\times 2$	2	occupational scenario within the scope of the risk evaluation	
Metric 4:	Temporal Representativeness	High	$\times 2$	2	2016	
Metric 5:	Sample Size	N/A		N/A	No Comment.	
Domain 3: Accessibility/Clari	tv					
Metric 6:	Metadata Completeness	High	$\times 1$	1	Clear documentation of data sources, methods, results and assumptions	
Domain 4: Variability and Un	certainty					
Metric 7:	Metadata Completeness	Low	$\times 1$	3	Document does not address variability or uncertainty	
	Cor	tinued on	ı next pa	ge		

Source Citation: Type of Data Source Hero ID	U.S, E. P. A. 2017. Information on the various spray polyurethane foam products. Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data; 3970070							
EVALUATION								
Domain	Metric	Rating	$MWF^{\star}$ Score	Comments				
Overall Quality Determination <sup><math>\dagger</math></sup>		High	1.2					

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\* MWF = Metric Weighting Factor
Source Citation: Type of Data Source	Nrc, 1981. Prudent practices for handling hazardous chemicals in laboratories. Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;								
Hero ID	3982104								
EXTRACTION									
Parameter			Data						
Life Cycle Stage			Use						
Life Cycle Descrir	otion (Subca	tegory of Use):	Laborat	orv					
Route of Exposure	e:		Inhalati	on, derm	nal				
Engineering Contr	ol & percer	t Exposure Reduction:	Recomn	nended:	Hood				
PPE:	1		Recomm	nended:	Nitrile 1	ubber for gloves and other materials			
EVALUATION									
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments			
	••••								
Domain 1: Reliad	Motrie 1.	Mathadalam	II: mb	V 1	1				
	metric 1:	Methodology	підп	X 1	1	National Research Council			
Domain 2: Repres	entative								
	Metric 2:	Geographic Scope	High	$\times 1$	1	US			
	Metric 3:	Applicability	High	$\times 2$	2	occupational scenario within the scope of the risk evaluation			
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1981			
	Metric 5:	Sample Size	N/A		N/A	No Comment.			
Domain 3: Access	ibility/Clari	ity	TT: 1		1				
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and as- sumptions			
Domain 4: Variab	ility and Ur	ncertainty							
	Metric 7:	Metadata Completeness	High	$\times 1$	1	Clearly documented			
		+	· · · ·						
Overall Quality D	eterminatio	n'	High		1.5				

\* MWF = Metric Weighting Factor
 † If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.</li>

Source Citation:	Oehha, 2007. Occupational health hazard risk assessment project for California: Identification of chemicals of concern,								
Type of Data Source Hero ID	Occupational Exposure; Completed Exposure or Risk Assessments; 3982225								
EXTRACTION									
Parameter	Data								
Life Cycle Stage: Life Cycle Description (Subcategory of Use):			Manufacturing All life cycle st	, process ages	ing, use				
EVALUATION									
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments			
Domain 1: Reliab	ility Metric 1:	Methodology	High	× 1	1	California Environmental Protection Agency Office of Environ- mental Health			
Domain 2: Ropros	contativo								
Domain 2. Repres	Metric 2:	Geographic Scope	High	× 1	1	US			
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	Doesn't provide data applicable to risk assessment (primarily provides recommended exposure limits)			
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2007			
	Metric 5:	Sample Size	N/A		N/A	No Comment.			
Domain 3: Access	ibility/Clar Metric 6:	ity Metadata Completeness	High	$\times 1$	1	Clear documentation of data sources, methods, results and as- sumptions			
Domain 4: Variab	High	× 1	1	Clear documentation of data sources, methods, results and as- sumptions					
Overall Quality D	eterminatio	$\mathrm{n}^\dagger$	Unacceptable		4.0	Metric Mean Score: 2.0.			

\* MWF = Metric Weighting Factor

Source Citation:	Atsdr., 2009. Health consultation: Indoor air quality: Raytheon area: St. Petersburg, Pinellas County, Florida: EPA facility ID: FLD004100152, Part 2							
Type of Data Source Hero ID	Occupation 3982212	nal Exposure; Reports for Data	or Information (	Other tha	in Expo	sure or Release Data;		
EXTRACTION								
Parameter			Data					
Life Cycle Stage:			Processing/use					
Life Cycle Descrip	ption (Subca	ategory of Use):	Processing/use					
EVALUATION								
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments		
Domain 1: Reliab	ility							
	Metric 1:	Methodology	High	$\times 1$	1	Florida Department of Health		
Domain 2: Repres	sentative							
1	Metric 2:	Geographic Scope	High	$\times 1$	1	US		
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	Exposure data for general population. Didn"t end up sampling for 1,4-dioxane		
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2009		
	Metric 5:	Sample Size	High	$\times 1$	1	Full characterization		
Domain 3: Accoss	yibility/Clar	i+.,						
Domain 5. Access	Metric 6:	Metadata Completeness	High	$\times 1$	1	Clear documentation of data sources, methods, results and as- sumptions		
Domain 4: Variab	Metric 7:	ncertainty Metadata Completeness	High	$\times 1$	1	Clear documentation of data sources, methods, results and as- sumptions		
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	Unacceptable		4.0	Metric Mean Score: 1.7.		

\* MWF = Metric Weighting Factor

Source Citation: Type of Data Source	Osha, 2004. Personal protective equipment. Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data; 3078348								
	3970340								
Parameter			Data						
Life Cycle Stage: Life Cycle Description (Subcategory of Use): PPE:				Manufacturing, processing, use All life cycle stages General information about types of PPE use in industry. Not chemical or process-specific.					
EVALUATION									
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments			
Domain 1: Reliab	ility Metric 1:	Methodology	High	$\times 1$	1	OSHA			
Domain 2: Repres	sentative								
Domain 2. Repres	Metric 2:	Geographic Scope	High	$\times 1$	1	US			
	Metric 3:	Applicability	Low	$\times 2$	6	Very general description of recommendations for PPE in in- dustry. Nothing specific to dioxane.			
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2004			
	Metric 5:	Sample Size	N/A		N/A	No Comment.			
Domain 3: Access	sibility/Clar Metric 6:	ity Metadata Completeness	High	$\times 1$	1	Clear documentation of data sources, methods, results and as- sumptions			
Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness High				× 1	1	Clear documentation of data sources, methods, results and as- sumptions			
Overall Quality D	Determinatio	n <sup>†</sup>	Medium		1.8				

## PEER REVIEW DRAFT, DO NOT CITE OR QUOTE

Source Citation:	U.S, E. P. A. 1978. OAQPS guideline series: Control of volatile organic emissions from manufacture of synthesized pharma- ceutical products.							
Type of Data Source Hero ID	Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data; 3970050							
EXTRACTION Parameter	Data							
Life Cycle Stage:UseLife Cycle Description (Subcategory of Use):Industrial Use - PlNumber of Sites:800 PharmaceuticNumber of Workers:Usually < 25 empl				Pharma tical pla ployees	aceuticals ants in the US and territories per site			
<b>EVALUATION</b> Domain		Metric	Rating MWF* Score Comments					
Domain 1: Reliab	ility Metric 1:	Methodology	High	× 1	1	EPA OAQPS		
Domain 2: Repres	sentative Metric 2:	Geographic Scope	High	× 1	1	US		
	Metric 3: Metric 4: Metric 5:	Applicability Temporal Representativeness Sample Size	Low N/A	$\times 2 \times 2$	$ \begin{array}{c} 2 \\ 6 \\ N/A \end{array} $	Scenarios within the scope of the risk evaluation 1978 No Comment.		
Domain 3: Access	sibility/Clar Metric 6:	ity Metadata Completeness	High	$\times 1$	1	Clear documentation of data sources, methods, results and as- sumptions		
Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness				× 1	1	clear documentation of variability and uncertainty - states gen- eralizations are difficult since there is a lot of variability be- tween plants and volumes of chemicals used		
Overall Quality Determination <sup>†</sup> High     1.5								

\* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID	Ecjrc, 2002. European Union risk assessment report: 1,4-dioxane. 2nd Priority List. Occupational Exposure; Completed Exposure or Risk Assessments; 196351								
EXTRACTION Parameter			Data						
Life Cycle Stage: Life Cycle Description (Subcategory of Use): PPE:				Manufacturing, processing, use All life cycle stages Exposure assessed without taking into account influence of PPE. But, PPE is likely to reduce exposure by 85 percent for dermal and 90 percent for inhalation					
EVALUATION									
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments			
Domain 1: Reliab	ility Metric 1:	Methodology	High	$\times 1$	1	European Chemicals Bureau			
Domain 2: Repres	sentative								
	Metric 2:	Geographic Scope	Medium	$\times 1$	2	EU			
	Metric 3:	Applicability	High	$\times 2$	2	Scenarios within the scope of the risk evaluation			
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2002			
	Metric 5:	Sample Size	Medium	× 1	2	Some datasets are presented as ranges with arithmetic averages and 90th percentile. Some are just presented as ranges with no additional data.			
Domain 3: Access	sibility/Clar	ity							
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Clear documentation of data sources, methods, results and assumptions			
Domain 4: Variat	oility and U	ncertainty							
	Metric 7:	Metadata Completeness	High	$\times 1$	1	clear documentation of variability and uncertainty			
Overall Quality I	Determinatio	$\mathbf{n}^{\dagger}$	High		1.4				

\* MWF = Metric Weighting Factor

XTRACTION		Data			
1 di ameter		Data			
Life Cycle Stage:		Manufact	ure		
Life Cycle Description (Subcate	egory of Use):	Manufact	ure of Di	oxane	
Route of Exposure:		Inhalation	1		
Exposure Concentration (Unit)	:	Provides of	data from	ı differe	ent tasks (storage, repair, sytheses, etc) (Table
		4.1). Also	estimate	es expos	sure using modeling.
Number of Samples:		5  sets of  c	lata, witl	n n rang	ging from 1 to 305 for each set
Type of Measurement or Metho	od:	EASE Mo	odel and	samplin	lg
Worker Activity:		Productic	on, sampl	ing, dru	imming, cleaning, and maintenance.
Type of Sampling:		area and	personal	samplin	lg
Exposure Duration:		0-8 nr ior	run snitt	, 0-0.5	nr for snort term
Exposure Frequency:		225 days/	year		
VALUATION					
Domain	Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments
Domain 1: Reliability					
Metric 1:	Methodology	High	$\times 1$	1	European Chemicals Bureau
Domain 2: Representative					
Metric 2:	Geographic Scope	Medium	$\times 1$	2	${ m EU}$
Metric 3:	Applicability	High	$\times 2$	2	Scenarios within the scope of the risk evaluation
Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2002
Metric 5:	Sample Size	Medium	$\times 1$	2	Some datasets are presented as ranges with arithmetic averages and 90th percentile. Some are just presented as ranges with no additional data.
Domain 3: Accessibility/Clarity	<i>T</i>				
Metric 6:	Metadata Completeness	High	$\times 1$	1	Clear documentation of data sources, methods, results and assumptions
Domain 4. Variability and Una	ortainty				
Motrie 7:	erianny Motadata Completeness	High	$\sim 1$	1	along documentation of regionality and uncontrainty
Metric 7.	Metadata Completeness	Ingn	~ 1	1	clear documentation of variability and uncertainty

Source Citation: Type of Data Source Hero ID	Ecjrc, 2002. European Union risk assessment report: 1,4-dioxane. 2nd Priority List. Occupational Exposure; Completed Exposure or Risk Assessments; 196351						
<b>EVALUATION</b> Domain	Metric	Rating MWI	T* Score	Comments			
Overall Quality D	$\operatorname{Petermination}^{\dagger}$	High	1.4				

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\* MWF = Metric Weighting Factor

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Source Citation:Ecjrc,. 200Type of Data SourceOccupationHero ID196351	02. European Union risk assessm nal Exposure; Completed Expos	ent report: ure or Risk	1,4-diox Assessm	kane. 2n nents;	d Priority List.					
EXTRACTION Parameter		Data								
		р .	1							
Life Cycle Stage:		Processin	g/use	1 /						
Life Cycle Description (Subc	ategory of Use):	Formulati	ion of pr	oducts o	containing 1,4-dioxane					
Route of Exposure:		Innalatio	n and de	rmai	mm/m2Trunical inholotion. 40 mm/m2Dommal.					
Exposure Concentration (On	lt <i>)</i> :	420  mg/r	e mnaiat. m3	1011: 180	mg/m51ypicai mnaiation: 40 mg/m5Dermai:					
Number of Sites:		420 mg./1	1115							
Type of Measurement or Met	hod:	EASE me	odel							
Worker Activity:	ilou.	adding of	the subs	tance to	a mixture, mixing and finally drumming or					
		bagging o	f the pro	duct. In	a case of 1.4-dioxane the highest exposure prob-					
		ably occu	rs during	adding	of the substance and drumming of the product.					
Exposure Duration:		6-8 hr for	full shif	ť						
Exposure Frequency:	Exposure Frequency:				225 days/year					
EVALUATION										
Domain	Metric	Rating	$\rm MWF^{\star}$	Score	Comments					
Domain 1: Beliability										
Metric 1:	Methodology	High	$\times 1$	1	European Chemicals Bureau					
Domain 2: Representative	~									
Metric 2:	Geographic Scope	Medium	× 1	2	EU					
Metric 3:	Applicability	High	$\times 2$	2	Scenarios within the scope of the risk evaluation					
Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2002					
Metric 5:	Sample Size	$ \begin{array}{cccc} \mbox{Medium} & \times 1 & 2 & \mbox{Some datasets are presented as ranges with arithmetic averages} \\ \mbox{and 90th percentile. Some are just presented as ranges with} \\ \mbox{no additional data.} \end{array} $								
	·									
Domain 3: Accessibility/Clar Metric 6:	ity Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and as- sumptions					
Domain 3: Accessibility/Clar Metric 6:	ity Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and as- sumptions					
Domain 3: Accessibility/Clar Metric 6: Domain 4: Variability and U:	ity Metadata Completeness ncertainty	High	× 1	1	Clear documentation of data sources, methods, results and as- sumptions					
Domain 3: Accessibility/Clar Metric 6: Domain 4: Variability and U: Metric 7:	ity Metadata Completeness ncertainty Metadata Completeness	High High	× 1 × 1	1	Clear documentation of data sources, methods, results and as- sumptions					

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Source Citation:	Ecjrc, 2002. European Union risk assessment report: 1,4-dioxane. 2nd Priority List.							
Type of Data Source	Occupational Exposure; Completed Exposure or Risk Assessments;							
Hero ID	196351							
EVALUATION	EVALUATION							
Domain	Domain Metric Rating MWF* Score Comments							
Overall Quality Determination <sup>†</sup> High 1.4								

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Source Citation:Ecjrc., 200Type of Data SourceOccupationHero ID196351	2. European Union risk assessm nal Exposure; Completed Expos	ent report: ure or Risk	1,4-diox Assessm	ane. 2n ents;	d Priority List.	
EXTRACTION Parameter		Data				
Life Cycle Stage		Uso				
Life Cycle Description (Subca	togory of Use).	End use o	f = 1 4 dic	vono or	the product contigning 1.4 dioyano	
Boute of Exposure:	itegory of Ose).	Inhalation	n 1,4-uio. 1 and der	mal	the product contraining 1,4-dioxane	
Exposure Concentration (Uni	t):	Exposure	data ava	ilable d	estimates from modeling	
Number of Samples:		5 data set	s. $n=1$ to	305 fc	or each	
Type of Measurement or Met	hod:	EASE and	d samplii	19 19		
Worker Activity:		medicine	mfg. pha	-o rmaceu	tical production, use as a solvent	
Type of Sampling:		stationary	and per	sonal s	amples	
Exposure Duration:		6-8 hr for	full shift	, 0-0.5	hr for short term	
Exposure Frequency:		225  days/	year			
EVALUATION						
Domain	Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments	
Domain 1: Reliability Metric 1:	Methodology	High	$\times 1$	1	European Chemicals Bureau	
Domain 2: Representative						
Metric 2:	Geographic Scope	Medium	$\times 1$	2	EU	
Metric 3:	Applicability	High	$\times 2$	2	Scenarios within the scope of the risk evaluation	
Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2002	
Metric 5:	Sample Size	Medium	× 1	2	Some datasets are presented as ranges with arithmetic averages and 90th percentile. Some are just presented as ranges with no additional data.	
Domain 3: Accessibility/Clari	ity					
Metric 6:	Metadata Completeness	High	$\times 1$	1	Clear documentation of data sources, methods, results and assumptions	
Domain 4: Variability and Ur	ncertainty					
Metric 7:	Metadata Completeness	High	$\times 1$	1	clear documentation of variability and uncertainty	
Overall Quality Determinatio	n†	High		1.4		
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Source Citation: Type of Data Source Hero ID	Ecjrc, 2002. European Union risk assessment report: 1,4-dioxane. 2nd Priority List. Occupational Exposure; Completed Exposure or Risk Assessments; 196351						
EVALUATION							
Domain	Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments		

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 $\star$  MWF = Metric Weighting Factor

Source Citation: Aca, 2015. Re: TSCA Work Plan Chemical Problem Formulaton and Initial Assessment for 1,4-Dioxane. Type of Data Source Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;									
Hero ID 3809105									
EXTRACTION									
Parameter		Data							
Life Cycle Stage			Manufacturing processing use						
Life Cycle Description (Subc	ategory of Use):	All life	cvcle sta	ges					
Route of Exposure:		Inhalati	ion	0					
Exposure Concentration (Un	it):	summar	rizes expo	osure da	ata from ECB 2002 (HERO ID 196351)				
EVALUATION									
Domain	Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments				
Domain 1: Reliability		TT: 1	1	1					
Metric 1:	Methodology	High	× 1	1	2015 PF (US EPA)				
Domain 2: Representative									
Metric 2:	Geographic Scope	High	$\times 1$	1	US				
Metric 3:	Applicability	High	$\times 2$	2	Scenarios within the scope of the risk evaluation				
Metric 4:	Temporal Representativeness	High	$\times 2$	2	2015				
Metric 5:	Sample Size	N/A		N/A	No Comment.				
Domain 3: Accessibility/Clar Metric 6:	nty Metadata Completeness	High	$\times 1$	1	Clear documentation of data sources, methods, results and as- sumptions				
Domain 4: Variability and U	Nete lete Conveletore	TT:1.	1	1					
Metric 7:	Metadata Completeness	High	× 1	1	clear documentation of variability and uncertainty				
Overall Quality Determination <sup><math>\dagger</math></sup>				1.0					

\* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID	Cameo, Chemicals. 2016. Chemical datasheet: dioxane. Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data; 3981005								
EXTRACTION Parameter			Data						
Life Cycle Stage: Life Cycle Description (Subcategory of Use): PPE:			Manufacturing, processing, use All life cycle stages Generic PPE recommendations						
EVALUATION									
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments			
Domain 1: Reliab	ility Metric 1:	Methodology	High	$\times 1$	1	CAMEO Chemicals (NOAA)			
Domain 2: Repres	sentative Metric 2: Metric 3: Metric 4: Metric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	High High High N/A	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \end{array}$	1 2 2 N/A	US General information that likely applies to all scenarios 2017 No Comment.			
Domain 3: Access	sibility/Clar Metric 6:	ity Metadata Completeness	N/A		N/A	No Comment.			
Domain 4: Variab	ility and Ur Metric 7:	ncertainty Metadata Completeness	N/A		N/A	No Comment.			
Overall Quality Determination <sup>†</sup>			High		1.0				

\* MWF = Metric Weighting Factor
<sup>†</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.</li>

Source Citation:	Fishbein, I and allyl d	Fishbein, L. 1981. Carcinogenicity and mutagenicity of solvents I Glycidyl ethers, dioxane, nitroalkanes, dimethylformamide and allyl derivatives. Science of the Total Environment							
Type of Data Source Hero ID	Occupation 61633	Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data; 61633							
EXTRACTION									
Parameter			Data						
Life Cycle Stage: Life Cycle Description (Subcategory of Use):		Manufacturing All life cycle st	Manufacturing, processing, use All life cycle stages						
EVALUATION									
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments			
Domain 1: Reliab	ility								
	Metric 1:	Methodology	High	$\times 1$	1	U.S. Dept. of Health and Human Sciences, Food & Drug Administration			
Domain 2: Repres	sentative								
	Metric 2:	Geographic Scope	High	$\times 1$	1	US			
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	Primarily use as a stabilizer for TCE, which is out of scope. Mostly health information.			
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1981			
	Metric 5:	Sample Size	N/A		N/A	No Comment.			
Domain 3: Access	sibility/Clari	ity							
	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.			
Domain 4: Variab	oility and Ur	ncertainty							
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.			
Overall Quality D	Determination	$\mathbf{n}^{\dagger}$	Unacceptable		4.0	Metric Mean Score: 2.7.			

\* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID	<ul> <li>Niosh, 1994. NIOSH pocket guide to chemical hazards.</li> <li>Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data; 2328101</li> </ul>							
EXTRACTION Parameter			Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): PPE:		Manufacturing, processing, use All life cycle stages Generic PPE recommendations						
EVALUATION								
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments		
Domain 1: Reliab	ility Metric 1:	Methodology	High	$\times 1$	1	NIOSH		
Domain 2: Repres	sentative Matria 2:	Caographia Saona	Uigh	× 1	1			
	Metric 2: Metric 3:	Applicability	High	$\times 1$ $\times 2$	1	US Concernal information that likely applies to all scenarios		
	Metric 4:	Temporal Representativeness	Low	$\times 2 \times 2$	6	1994		
	Metric 5:	Sample Size	N/A		N/A	No Comment.		
Domain 3: Access	sibility/Clar Metric 6:	ity Metadata Completeness	N/A		N/A	No Comment		
	Metric 0.	Metadata Completeness	11/11		11/11	No comment.		
Domain 4: Variab	ility and U	ncertainty	/ .		/ -			
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.		
Overall Quality Determination <sup>†</sup>		Medium		1.7				

\* MWF = Metric Weighting Factor
 † If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.</li>

Source Citation:	Kupczewska-Dobecka, M., Czerczak, S., Jakubowski, M., Maciaszek, P., Janasik, B. 2010. [Application of predictive model to estimate concentrations of chemical substances in the work environment]. Medveyna Pracy								
Type of Data Source Hero ID	Occupation 2583051	Occupational Exposure; Published Models for Exposures or Releases; 2583051							
EXTRACTION									
Parameter									
Life Cycle Stage:			Manufacturing	. process	ing. use				
Life Cycle Descrip	otion (Subca	ategory of Use):	All life cycle st	ages					
Type of Measurer	nent or Met	hod:	Potentially info	ormation	about ]	EASE Model, but not in English			
EVALUATION									
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments			
	.1.,								
Domain 1: Reliab	Metric 1.	Methodology	High	× 1	1	FASE Model used by FIL			
	WICUIC 1.	Wethodology	Ingli	~ 1	1	EASE Model, used by EO			
Domain 2: Repres	sentative								
	Metric 2:	Geographic Scope	Medium	$\times 1$	2	EU			
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	Unknown - paper in different language, but likely applicable. In any case, this source is not useful.			
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2010			
	Metric 5:	Sample Size	N/A		N/A	No Comment.			
Domain 3: Access	sibility/Clar	ity							
	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.			
Domain 4. Variat	vility and U	acortainty							
Domain 4. Variat	Metric 7.	Metadata Completeness	N/A		N/A	No Comment			
					- 1/ - 1				
Overall Quality D	Determinatio	$\mathbf{n}^{\dagger}$	Unacceptable		4.0	Metric Mean Score: 2.2.			

\* MWF = Metric Weighting Factor

Source Citation:	Burton, N Division, I	Burton, N. C., Driscoll, R. J., 1997. Health hazard evaluation report no. HETA-95-0293-2655, Dana Corporation, Spicer Axle Division Fort Wayne Indiana							
Type of Data Source Hero ID	Occupatio 3859373	Occupational Exposure; Monitoring Data; 3859373							
EXTRACTION									
Parameter			Data						
Life Cycle Stage:			Uso						
Life Cycle Descrip	ntion (Subca	ategory of Use):	MWF						
Exposure Concen	tration (Uni	it):	0.14 to 0	.23 mg/i	m3 (are	(a)0.24 to $(0.53)$ (PBZ)These are exposures to			
1	× ×	,	MWF, no	t dioxan	e specifi	ically			
Number of Sampl	les:		6  PBZ, 4	area	-				
Worker Activity:			Threader	, broachi	ng, Ape	ex drill, lunch tables (for area)Transfer lines,			
			roughing,	four-way	y, multij	ple, screw machine-lathing, and apex drill (for			
			pbz)						
Type of Sampling:			area and	personal	samplir	ng			
Exposure Duratio	on:		7 hours	sample t	ime				
Analytic Method:			NIOSH N	NIOSH Method 0500 - 1 VC inters at 2 L/inin					
EVALUATION									
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments			
Domain 1, Paliah	.:1:+								
Domain 1. Renau	Metric 1:	Methodology	High	$\times 1$	1	NIOSH HHE			
Domain 9. Donna	contotino								
Domain 2: Repres	Motric 2:	Coographic Scope	High	$\sim 1$	1	119			
	Metric 3:	Applicability	Medium	$\times 2$	4	Scenario is within the scope, but samples are for MWF, not			
	Medile 9.	rippicability	Wiedfulli	~ 2	1	Dioxane. Could possible still use data to estimate dioxane exposures from MWF use			
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1997			
	Metric 5:	Sample Size	High	$\times 1$	1	workers sampled at the factory			
Domain 3: Access	sibility/Clar	ity							
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Clear documentation of data sources, methods, results and assumptions			
Domain 4. Veriet	ilitar and TI-	n containt-							
Domain 4: Variat	Metric 7.	Metadata Completeness	High	× 1	1	clear documentation of variability and uncertainty			
	· ·		0	·· +	-	another of the faith of and another the			
		~							

Source Citation: Type of Data Source Hero ID	Burton, N. C.,Driscoll, R. J., 1997. Division, Fort Wayne, Indiana. Occupational Exposure; Monitoring 3859373	Health hazard eva g Data;	luation r	eport no.	HETA-95-0293-2655, Dana Corporation, Spicer Axle
EVALUATION					
Domain	Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments
Overall Quality D	$\operatorname{Petermination}^\dagger$	Medium		1.7	

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\* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID	Haz, Map. Occupation 3970253	Haz, Map. 2017. Haz-Map: Agent name: 1,4-Dioxane. Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data; 3970253						
EXTRACTION			Data					
Parameter			Data					
Life Cycle Stage:			All stages					
Life Cycle Descrip	otion (Subca	tegory of Use):	All stages					
EVALUATION								
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments		
Domain 1: Reliab	ility							
	Metric 1:	Methodology	High	$\times 1$	1	TOXNet/Hazmap		
Domain 2: Repres	sentative							
	Metric 2:	Geographic Scope	High	$\times 1$	1	US		
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	Some physical property and health information, but not expo- sure		
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2016		
	Metric 5:	Sample Size	N/A		N/A	No Comment.		
Domain 3: Access	sibility/Clar	ity						
	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.		
Domain 4. Variah	vility and Ur	cortainty						
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.		
Overall Quality D	Determinatio	$\mathbf{n}^{\dagger}$	Unacceptable		4.0	Metric Mean Score: 2.0.		

\* MWF = Metric Weighting Factor

Source Citation:EcjType of Data SourceOccHero ID196	rc, 200 cupation 351	02. European Union risk assessm nal Exposure; Completed Expos	nent report: ure or Risk	1,4-diox Assessm	ane. 2n ents;	d Priority List.		
EXTRACTION								
Parameter			Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Exposure Concentration (Unit):			All stages All life cy Summary 196351)	All stages All life cycle stages Summary of exposure data from 2002 EU Risk Assessment (HERO ID: 196351)				
EVALUATION								
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments		
Domain 1: Reliability Me	tric 1:	Methodology	High	$\times 1$	1	European Chemicals Bureau		
						· · · ·		
Domain 2: Representa	tive	Coordination Coordination	M	. 1	0			
Me	tric 2:	Geographic Scope	Medium	$\times 1$	2	EU		
Me	$\frac{110}{10}$	Temporal Representativeness	Medium	$\times 2$ $\times 2$	2 1	Scenarios within the scope of the risk evaluation		
Me	tric 5:	Sample Size	Medium	$\times 1 \times 1$	2	Some datasets are presented as ranges with arithmetic averages and 90th percentile. Some are just presented as ranges with no additional data.		
Domain 2. Accordibilit	ty/Clan	:+						
Domain 5. Accession Me	tric 6:	Metadata Completeness	High	$\times 1$	1	Clear documentation of data sources, methods, results and as- sumptions		
Domoin 4. Vonichilita	and U	a conta inter						
Me	tric 7:	Metadata Completeness	High	$\times 1$	1	clear documentation of variability and uncertainty		
Overall Quality Determination <sup>†</sup>			High		1.4			

Source Citation: Type of Data Source Hero ID	Echa, 2017. Uses by professional workers: 1,4-Dioxane. Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data; 3970673							
EXTRACTION Parameter			Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Worker Activity:			Manufacturing, processing, use Manufacturing, processing, use List of generic uses and generic worker activites, but no data.					
EVALUATION								
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments		
Domain 1: Reliab	ility Metric 1:	Methodology	High	$\times 1$	1	ECHA/REACH		
Domain 2: Repres	Motric 2:	Goographic Scope	Modium	$\sim 1$	9	דו		
	Metric 2.	Applicability	Unaccentable	$\times 1$ $\times 2$	2 8	EU Ceneric use descriptions, no useful information		
	Metric 4:	Temporal Representativeness	Medium	$\times 2 \times 2$	4	Unknown, but probably recent		
	Metric 5:	Sample Size	N/A		N/A	No Comment.		
Domain 3: Accoss	ubility/Clari							
Domain 5. Access	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.		
Domain 4: Variab	oility and Ur Metric 7:	ncertainty Metadata Completeness	N/A		N/A	No Comment.		
Overall Quality Determination <sup>†</sup>		Unacceptable		4.0	Metric Mean Score: 2.5.			

\* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID	Iarc, 1999. IARC Monographs on the evaluation of carcinogenic risks to humans: 1,4-Dioxane. Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data; 3970850							
EXTRACTION								
Parameter			Data					
Life Cycle Stage			All stages					
Life Cycle Descrit	otion (Subca	tegory of Use):	All life cycle st	ages				
Route of Exposur	e:		inhalation, ora	l. Poor s	kin pen	etration		
Exposure Concent	tration (Uni	t):	No data were a	vailable	to the V	Working Group		
EVALUATION								
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments		
	•1•,							
Domain 1: Reliab	Motrie 1.	Mathadalam	Himb	× 1	1	IADO		
	Metric 1:	Methodology	підіі	× 1	1	IARC		
Domain 2: Repres	sentative							
× ×	Metric 2:	Geographic Scope	High	$\times 1$	1	US		
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	No exposure or release data. Lots of human health data		
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	1999		
	Metric 5:	Sample Size	N/A		N/A	No Comment.		
		.,						
Domain 3: Access	Matuia C	Ity Mata data Gammlatan an	NT / A		NT / A	N. G.		
	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.		
Domain 4: Variab	ility and Ur	ncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.		
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	Unacceptable		4.0	Metric Mean Score: 2.3.		

\* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID	Niosh, 2013. 1, 4- Dioxane. Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data; 3978115						
EXTRACTION Parameter			Data				
Life Cycle Stage: Life Cycle Descrij	ption (Subca	tegory of Use):	All stages All stages				
EVALUATION							
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments	
Domain 1: Reliab	ility Metric 1:	Methodology	High	× 1	1	NIOSH	
Domain 2: Repres	sentative						
	Metric 2:	Geographic Scope	High	$\times 1$	1	US	
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	Physical properties	
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	Unknown, but probably recently updated	
	Metric 5:	Sample Size	N/A		N/A	No Comment.	
Domain 3: Access	sibility/Clar	ity					
	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.	
Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness		N/A		N/A	No Comment.		
Overall Quality D	eterminatio	n <sup>†</sup>	Unacceptable		4.0	Metric Mean Score: 2.3.	

\* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID	Niosh, Dioxane. Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data; 3978116							
EXTRACTION			_					
Parameter			Data					
Life Cycle Stage:			All stages					
Life Cycle Descrip	otion (Subca	tegory of Use):	All stages					
Route of Exposur	e:	/	inhalation, skir	ı absorpt	ion, ing	estion, skin and/or eye contact		
EVALUATION								
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments		
Domain 1: Reliab	ility							
	Metric 1:	Methodology	High	$\times 1$	1	NIOSH		
Domain 2: Repres	sentative							
Domain _ Topro	Metric 2:	Geographic Scope	High	$\times 1$	1	US		
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	Pocket guide, physical properties and health information		
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2016		
	Metric 5:	Sample Size	N/A		N/A	No Comment.		
Domain 3: Access	Motrie 6:	Motadata Completeness	N / A		N / A	No Comment		
	Methic 0.	Metadata Completeness	N/A		$\mathbf{N}/\mathbf{A}$	No comment.		
Domain 4: Variab	oility and Ur	ncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.		
Overall Quality D	eterminatio	$\mathrm{n}^\dagger$	Unacceptable		4.0	Metric Mean Score: 2.0.		

\* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID	Niosh,,Dps Occupation 3978117	Niosh,,Dpse, 1994. Dioxane, Part 2. Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data; 3978117							
EXTRACTION Parameter			Data						
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Type of Measurement or Method:			All stages All life cycle stages NIOSH Method 1602						
EVALUATION									
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments			
Domain 1: Reliab	ility Metric 1:	Methodology	High	$\times 1$	1	NIOSH			
Domain 2: Ropro	contativo								
Domain 2. Repres	Metric 2.	Geographic Scope	High	× 1	1	US			
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	NIOSH method for sampling dioxane, but no exposure data			
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1994			
	Metric 5:	Sample Size	N/A		N/A	No Comment.			
Domain 3: Access	sibility/Clar	ity							
Domain 9. Meees	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.			
Domain 4: Variab	oility and Ur Metric 7:	ncertainty Metadata Completeness	N/A		N/A	No Comment.			
Overall Quality D	Determinatio	$\mathrm{n}^\dagger$	Unacceptable		4.0	Metric Mean Score: 2.7.			

\* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID	Echa,. Lin Occupation 4121210	Echa,. Links to registration dossiers. Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data; 4121210						
EXTRACTION Parameter			Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use):		All stages All life cycle st	All stages All life cycle stages					
EVALUATION								
Domain		Metric	Rating	$MWF^*$	Score	Comments		
Domain 1: Reliab	ility Metric 1:	Methodology	High	$\times 1$	1	ECHA/REACH		
Domain 2: Repres	sentative	<b>a</b> 11 <b>a</b>		_	2			
	Metric 2:	Geographic Scope	Medium	$\times 1$	2	EU		
	Metric 3: Motrie 4:	Applicability	Unacceptable	$\times 2$	8	Generic worker descriptions, but not useful		
	Metric 4. Metric 5:	Sample Size	N/A	~ 4	N/A	No Comment.		
Domain 3: Access	ibility/Clar	itv						
	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.		
Domain 4: Variab	ility and Ur Metric 7:	ncertainty Metadata Completeness	N/A		N/A	No Comment.		
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	Unacceptable		4.0	Metric Mean Score: 2.2.		

\* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID	Niosh, 202 Occupation 3986439	Niosh, 2011. NIOSH manual of analytical methods: Formic acid. Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data; 3986439							
EXTRACTION Parameter			Data						
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Type of Measurement or Method:		All stages All life cycle stages NIOSH Method 2011 for Formic Acid							
EVALUATION									
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments			
Domain 1: Reliab	ility Metric 1:	Methodology	High	× 1	1	NIOSH			
Domain 2: Repres	sentative		TT: 1	1	1				
	Metric 2: Metric 3:	Geographic Scope Applicability	High Unacceptable	$\times 1 \times 2$	1 8	US NIOSH method for sampling formic acid. Uses dioxane as an optional reasont, but no supersum data			
	Metric 4: Metric 5:	Temporal Representativeness Sample Size	Low N/A	$\times 2$	$^{6}_{ m N/A}$	1994 No Comment.			
Domain 3: Access	sibility/Clari Metric 6:	ity Metadata Completeness	N/A		N/A	No Comment.			
Domain 4: Variab	oility and Ur Metric 7:	ncertainty Metadata Completeness	N/A		N/A	No Comment.			
Overall Quality D	eterminatio	n <sup>†</sup>	Unacceptable		4.0	Metric Mean Score: 2.7.			

\* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID	Niosh, 201 Occupation 3986437	Niosh, 2010. Monitoring data in workers from health evaluations. Occupational Exposure; Monitoring Data; 3986437							
EXTRACTION Parameter			Data						
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Exposure Concentration (Unit): Number of Samples: Number of Sites: Type of Measurement or Method: Worker Activity: Exposure Duration:			Use Deepwater Horizon Response workers all but one non-detect (0.2 ppb) 17 6 locations EPA TO-15 Summa; General Area sampling Various activities related to oil spill cleanup (dispersant operations and in-situ burning) 30-480 min						
<b>EVALUATION</b> Domain		Metric	Rating	MWF*	Score	Comments			
Domain 1: Reliab	ility Metric 1:	Methodology	High	$\times 1$	1	NIOSH			
Domain 2: Repres	sentative Metric 2: Metric 3: Metric 4: Metric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	High Unacceptable High High	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \\ \times \ 1 \end{array}$	$egin{array}{c} 1 \\ 8 \\ 2 \\ 1 \end{array}$	US Out of scope 2010 Samples of various activities			
Domain 3: Access	sibility/Clari Metric 6:	ity Metadata Completeness	N/A		N/A	No Comment.			
Domain 4: Variab	oility and Ur Metric 7:	ncertainty Metadata Completeness	N/A		N/A	No Comment.			
Overall Quality Determination <sup><math>\dagger</math></sup>		Unacceptable		4.0	Metric Mean Score: 1.9.				
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Source Citation: Type of Data Source Hero ID	Niosh, 2010. Monitoring data in workers from health evaluations. Occupational Exposure; Monitoring Data; 3986437						
EVALUATION							
Domain	Metric	Rating	$MWF^{\star}$	Score	Comments		

\* MWF = Metric Weighting Factor

Parameter		Data						
Life Cycle Stage:			Use					
Life Cycle Description (Subcategory of Use): Route of Exposure:			Printing					
			ı					
Exposure Concentration (Unit):								
Number of Samples:								
Number of Sites:		1						
Type of Measurement or Me	thod:	1.4-L TO	-15 canis	ter				
Worker Activity:		placed di	rectly ac	ljacent i	to the 3-D printer, with a short (1 ft) piece			
		of Tygon	tubingfi	xed to t	the inlet of the canister extending into the 3-			
		D printer	point c	of opera	tion, underneath the hinged, unventilated and			
			interlocked guard.					
Exposure Duration:		8 hours	8 hours					
Engineering Control & percent Exposure Reduction:		Provide local exhaust ventilation system. Ventilation should be sufficient						
		to effectively remove and prevent buildup of any dusts or fumes that may						
			be generated during handling or thermal processing.					
ALUATION								
VALUATION Domain	Metric	Rating	MWF*	Score	Comments			
VALUATION Domain	Metric	Rating	MWF*	Score	Comments			
VALUATION Domain Domain 1: Reliability Metric 1:	Metric	Rating	MWF*	Score 1	Comments Study authors are qualified, sampling method well describe and authors used an accredited IH lab for analysis			
VALUATION Domain Domain 1: Reliability Metric 1:	Metric	Rating High	MWF* $\times 1$	Score	Comments Study authors are qualified, sampling method well describe and authors used an accredited IH lab for analysis.			
VALUATION Domain Domain 1: Reliability Metric 1: Domain 2: Representative	Metric	Rating High	MWF*	Score	Comments Study authors are qualified, sampling method well describe and authors used an accredited IH lab for analysis.			
VALUATION Domain Domain 1: Reliability Metric 1: Domain 2: Representative Metric 2:	Metric Methodology Geographic Scope	Rating High High	$MWF^{\star} \times 1 \times 1$	Score 1	Comments Study authors are qualified, sampling method well describe and authors used an accredited IH lab for analysis. US			
VALUATION Domain Domain 1: Reliability Metric 1: Domain 2: Representative Metric 2: Metric 3:	Metric Methodology Geographic Scope Applicability	Rating High High High	$MWF^{\star} \times 1 \\ \times 1 \\ \times 2$	Score 1 1 2	Comments Study authors are qualified, sampling method well describe and authors used an accredited IH lab for analysis. US 3D Printing			
VALUATION Domain Domain 1: Reliability Metric 1: Domain 2: Representative Metric 2: Metric 3: Metric 4:	Metric Methodology Geographic Scope Applicability Temporal Representativeness	Rating High High High High	$MWF^{\star} \times 1 \\ \times 1 \\ \times 2 \\ \times 2 \\ \times 2$	Score 1 1 2 2	Comments Study authors are qualified, sampling method well describe and authors used an accredited IH lab for analysis. US 3D Printing 2016			
VALUATION Domain Domain 1: Reliability Metric 1: Domain 2: Representative Metric 2: Metric 3: Metric 4: Metric 5:	Metric Methodology Geographic Scope Applicability Temporal Representativeness Sample Size	Rating High High High High Medium	$\begin{array}{c} \text{MWF}^{\star} \\ \times 1 \\ \times 2 \\ \times 2 \\ \times 2 \\ \times 1 \end{array}$	Score 1 1 2 2 2 2	Comments Study authors are qualified, sampling method well describe and authors used an accredited IH lab for analysis. US 3D Printing 2016 only one sample			
VALUATION Domain Domain 1: Reliability Metric 1: Domain 2: Representative Metric 2: Metric 3: Metric 4: Metric 5:	Metric Methodology Geographic Scope Applicability Temporal Representativeness Sample Size	Rating High High High High Medium	$MWF^{\star}$ $\times 1$ $\times 1$ $\times 2$ $\times 2$ $\times 1$	Score 1 1 2 2 2 2	Comments Study authors are qualified, sampling method well describe and authors used an accredited IH lab for analysis. US 3D Printing 2016 only one sample			
VALUATION Domain Domain 1: Reliability Metric 1: Domain 2: Representative Metric 2: Metric 2: Metric 3: Metric 4: Metric 5: Domain 3: Accessibility/Clar	Metric Methodology Geographic Scope Applicability Temporal Representativeness Sample Size	Rating High High High High Medium	$MWF^{\star}$ $\times 1$ $\times 1$ $\times 2$ $\times 2$ $\times 1$	Score 1 1 2 2 2	Comments Study authors are qualified, sampling method well describ- and authors used an accredited IH lab for analysis. US 3D Printing 2016 only one sample			

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Source Citation: Type of Data Source Hero ID	T. Ryan, E Occupation 5080530	D. Hubbard. 2016. 3-D Printing nal Exposure; Monitoring Data;	Hazards: L	iterature	Review	v & Preliminary Hazard Assessment.	
EVALUATION							
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments	
	Metric 7:	Metadata Completeness	Medium	$\times 1$	2	Limited discussion of variability and uncertainty	
Overall Quality Determination <sup><math>\dagger</math></sup>			High		1.2		

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\* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID	Osha,. 201 Occupation 3986510	Osha,. 2016. Chemical exposure health data: Full data set. Occupational Exposure; Monitoring Data; 3986510						
EXTRACTION Parameter			Data					
Life Cycle Stage: Life Cycle Descrij	ption (Subca	ategory of Use):	unknown unknown					
EVALUATION								
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments		
Domain 1: Reliab	ility Metric 1:	Methodology	High	$\times 1$	1	OSHA		
Domain 2: Repres	sentative							
Domain 2. Repres	Metric 2:	Geographic Scope	High	× 1	1	US		
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	Looks like it should be an excel file with exposure data, but it's all smooshed together in a text file and not useful		
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	unknown, but probably recent		
	Metric 5:	Sample Size	High	$\times 1$	1	CEHD		
Domain 3: Access	sibility/Clar	ity						
	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.		
Domain 4: Variab	ility and Uı Metric 7:	ncertainty Metadata Completeness	N/A		N/A	No Comment.		
Overall Quality D	Determinatio	n <sup>†</sup>	Unacceptable		4.0	Metric Mean Score: 2.1.		

\* MWF = Metric Weighting Factor

Source Citation:	CalEpa, 2005. Appendix D.3 Chronic RELS and toxicity summaries using the previous version of Hot Spots Risk Assessment guidelines (OEHHA 1999).							
Type of Data Source Hero ID	Occupation 3982628	nal Exposure; Reports for Data	or Information (	Other tha	n Expo	sure or Release Data;		
EXTRACTION								
Parameter			Data					
Life Cycle Stage:		All stages	All stages					
Life Cycle Descrip	otion (Subca	itegory of Use):	All life cycle st	ages				
EVALUATION								
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments		
Domain 1. Kenab	Metric 1:	Methodology	High	× 1	1	ОЕННА		
			8					
Domain 2: Repres	sentative							
	Metric 2:	Geographic Scope	High	$\times 1$	1	US		
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	Human Health, physical properties data		
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	1999		
	Metric 5:	Sample Size	High	$\times 1$	1	CEHD		
Domain 2. Access	ihiliter/Class							
Domain 5: Access	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.		
		*	/		/			
Domain 4: Variab	ility and Ur	ncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.		
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	Unacceptable		4.0	Metric Mean Score: 2.1.		

\* MWF = Metric Weighting Factor

## PEER REVIEW DRAFT, DO NOT CITE OR QUOTE

Source Citation: Type of Data Source Hero ID	Ndcee, 1998. Engineering and technical services for join group on acquisition pollution prevention (JG-APP) pilot projects: Potential alternatives report JP-A-1-1: Alternatives to lead-containing dry film lubricants for antigalling/antifretting, anti- seizing, and assembly aid application. Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data; 3982114								
	0002111								
Parameter			Data						
Life Cycle Stage:			Use						
Life Cycle Descrip	otion (Subca	tegory of Use):	Lubricant						
EVALUATION									
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments			
	• • • •								
Domain 1: Reliab	ility Motrie 1.	Mathadalagy	Modium	× 1	9	National Defence Contar for Environmental Evallar of			
	metric 1.	Methodology	medium	× 1	2	National Defense Center for Environmental Excellence			
Domain 2: Repres	sentative								
	Metric 2:	Geographic Scope	High	$\times 1$	1	US			
	Metric 3:	Applicability	High	$\times 2$	2	Dry film lubricants for primariliy aerospace applications			
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	1998			
	Metric 5:	Sample Size	N/A		N/A	No Comment.			
	.1.11. /01	.,							
Domain 3: Access	Motrie 6	Ity Matadata Completeness	NI / A		NI / A	N. Communit			
	metric 0.	Metadata Completeness	N/A		N/A	No Comment.			
Domain 4: Variab	oility and Ur	ncertainty							
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.			
Overall Quality D	eterminatio	$\mathrm{n}^\dagger$	High		1.5				

Source Citation:	Hanley, K Controls	.,Trout, D.,Burt, S.,Mouradian, Greenfield Ohio	R 1995. He	ealth haza	ard eval	uation report no. HETA-90-0277-2487, Johnson
Type of Data Source Hero ID	Occupation 3859370	nal Exposure; Monitoring Data;				
EXTRACTION						
Parameter			Data			
Life Cycle Stage: Life Cycle Description (Subcategory of Use):			Use car seat mfg			
r						
EVALUATION						
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments
Domain 1: Beliah	ility					
Domain 1. Henab	Metric 1:	Methodology	High	$\times 1$	1	NIOSH
			0			
Domain 2: Repres	sentative					
	Metric 2:	Geographic Scope	High	$\times 1$	1	US
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	Use not in scope, related to 1,1,1-TCA. Polyurethane foam, but not spray application
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1995
	Metric 5:	Sample Size	High	$\times 1$	1	119 shift workers
Domain 3: Access	sibility/Clar	itv				
	Metric 6:	Metadata Completeness	Low	$\times 1$	3	qualitative assessment, not PBZ, Area samples, etc
Domain 4: Variab	ility and Ur	ncertainty				
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	qualitative assessment, not PBZ, Area samples, etc
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	Unacceptable		4.0	Metric Mean Score: 2.6.

\* MWF = Metric Weighting Factor
Occupational Exposure; Monitoring Data;         Bert RACTION         Parameter       Data         Life Cycle Stage:       Use         Life Cycle Description (Subcategory of Use):       Use         Inhalation         Review Concentration (Unit):       1.5 to 13.3 ppm (pbz)11.8 ppm (STEL)2.5 to 51 ppm (Area)         Number of Samples:       21 pbz12 area         Number of Sites:       1       various activities, tray cleaning         Exposure Duration:       full-shift15-min       Thigh         EVALUATION         Domain       Metric       Rating       MWF* Score       Comments         Domain 1: Reliability       Metric 1:       Metric 2: Geographic Scope       High       × 1       1       VIOSH         Morker 4: Temporal Representativeness       Metric 5: Sample Size       High       × 1       1       21 pbz12 area         Domain 3: Accessibility/Clarity       Metric 6: Metadata Completeness       High       × 1       1       User documentation of data sources, methods, results and assumptions         Oursain 3: Accessibility/Clarity         Metric 7: Metadata Completeness       High       × 1       1 <td< th=""><th>Source Citation:</th><th>Krake, A. Corporatio</th><th>M.,Herrera-Moreno, V 1995. on, Independence, Kansas.</th><th>Health hazard</th><th colspan="5">Health hazard evaluation report no. HETA-95-0296-2547, Automotive Controls</th></td<>	Source Citation:	Krake, A. Corporatio	M.,Herrera-Moreno, V 1995. on, Independence, Kansas.	Health hazard	Health hazard evaluation report no. HETA-95-0296-2547, Automotive Controls						
EXTRACTION Parameter     Data       Life Cycle Stage: Life Cycle Description (Subcategory of Use): Number of Exposure Exposure Concentration (Unit): Exposure Concentration (Unit): Exposure Concentration (Unit): Exposure of States: Number of States: Number of States: Number of Sites: Number of Site	Type of Data Source Hero ID	Occupation 3859374	nal Exposure; Monitoring Data;								
$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	EXTRACTION										
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	Parameter			Data							
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $				TT							
Life Cycle Description (studency of CSe):       Vapor degreasing Inhibition         Route of Exposure       Inhibition         Exposure Concentration (Unit):       1.5 to 13.3 ppm (bbp2)11.8 ppm (STEL)2.5 to 51 ppm (Area)         Number of Samples:       21 pbz12 area         Number of Sites:       1         Worker Activity:       various activities, tray cleaning full-shift15-min         EVALUATION       Metric       Rating       MWF* Score       Comments         Domain       Metric       Rating       MWF* Score       Comments         Domain 1: Reliability       Metric 1: Methodology       High       × 1       1       NIOSH         Domain 2: Representative       Metric 3: Applicability       Unacceptable       × 2       8       Vapor degreasing with 1,1,1-TCE, not in scope         Metric 4: Temporal Representativeness       Low       × 2       6       1995         Metric 5: Sample Size       High       × 1       1       21 pbs12 area         Domain 3: Accessibility/Clarity       Metric 7: Metadata Completeness       High       × 1       1       Clear documentation of data sources, methods, results and as- sumptions         Domain 4: Variability and Uncertainty       Metric 7: Metadata Completeness       High       × 1       1       clear documentation of variability and uncert	Life Cycle Stage:			Use Van en dermoori							
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	Boute of Exposur		tegory of Use).	Inhalation	ing						
Number of Stamples:       21 pbz12 area         Number of Stamples:       1         Number of Stamples:       1         Worker Activity:       various activities, tray cleaning         Exposure Duration:       full-shift15-min         EVALUATION       metric         Domain       Metric         Retric 1:       Methodology         High       × 1       1         Number of Stamples:       NIOSH         Domain 1: Reliability       High       × 1       1         Metric 2:       Geographic Scope       High       × 1       1         Metric 3:       Applicability       Unacceptable       × 2       8       Vapor degreasing with 1,1,1-TCE, not in scope         Metric 4:       Temporal Representativeness       Low       × 2       6       1995         Metric 5:       Sample Size       High       × 1       1       21 pbz12 area         Domain 3:       Accessibility/Clarity       Low       × 2       6       1995         Metric 6:       Metadata Completeness       High       × 1       1       Clear documentation of data sources, methods, results and assumptions         Domain 4:       Variability and Uncertainty       Metric 7:       Metric 7: <t< td=""><td>Exposure Concert</td><td>c. tration (Uni</td><td>t).</td><td>1.5 to <math>13.3</math> ppr</td><td>n (pbz)1</td><td>1.8 nnm</td><td>(STEL)2.5 to 51 ppm (Area)</td></t<>	Exposure Concert	c. tration (Uni	t).	1.5 to $13.3$ ppr	n (pbz)1	1.8 nnm	(STEL)2.5 to 51 ppm (Area)				
Number of Sites:       1         Worker Activity:       various activities, tray cleaning full-shift15-min         EVALUATION       Metric       Rating       MWF*       Score       Comments         Domain       Metric       Rating       MWF*       Score       Comments         Domain 1: Reliability       Metric 1:       Methodology       High       × 1       1       NIOSH         Domain 2: Representative       Metric 2:       Geographic Scope       High       × 1       1       US         Metric 2:       Geographic Scope       High       × 1       1       US         Metric 2:       Geographic Scope       High       × 1       1       US         Metric 4:       Temporal Representativeness       Low       × 2       6       1995         Metric 5:       Sample Size       High       × 1       1       21 pbz12 area         Domain 3: Accessibility/Clarity       Metric 6:       Metadata Completeness       High       × 1       1       Clear documentation of data sources, methods, results and assumptions         Domain 4: Variability and Uncertainty       Metric 7:       Metadata Completeness       High       × 1       1       clear documentation of variability and uncertainty         Overall	Number of Sampl	es:		21 pbz12 area	II (P02)1	no ppin					
Worker Activity: Exposure Duration:       various activities, tray cleaning full-shift15-min         EVALUATION       Domain       Metric       Rating       MWF*       Score       Comments         Domain 1: Reliability       Metric 1:       Methodology       High $\times$ 1       1       NIOSH         Domain 2: Representative       Metric 3:       Applicability       Unacceptable $\times$ 2       8       Vapor degreasing with 1,1,1-TCE, not in scope         Metric 4:       Temporal Representativeness       Low $\times$ 2       6       1995         Metric 5:       Sample Size       High $\times$ 1       1       21 pbz12 area         Domain 3: Accessibility/Clarity       Metric 6:       Metadata Completeness       High $\times$ 1       1       clear documentation of data sources, methods, results and assumptions         Domain 4: Variability and Uncertainty       Metric 7:       Metadata Completeness       High $\times$ 1       1       clear documentation of variability and uncertainty         Metric 7:       Metadata Completeness       High $\times$ 1       1       clear documentation of variability and uncertainty         Overall Quality Determination <sup>†</sup> Unacceptable       4.0       Metric Mean Score: 2.1.	Number of Sites:			1							
Exposure Duration:       full-shift15-min         EVALUATION       Metric       Rating       MWF*       Score       Comments         Domain       Metric       Rating       MWF*       Score       Comments         Domain 1:       Reliability       Metric 1:       Methodology       High       × 1       1       NIOSH         Domain 2:       Representative       Metric 2:       Geographic Scope       High       × 1       1       US         Metric 3:       Applicability       Unacceptable       × 2       8       Vapor degreasing with 1,1,1-TCE, not in scope         Metric 4:       Temporal Representativeness       Low       × 2       6       1995         Metric 5:       Sample Size       High       × 1       1       21 pbz12 area         Domain 3:       Accessibility/Clarity       Netric 6:       Metric 6:       High       × 1       1       Clear documentation of data sources, methods, results and assumptions         Domain 4:       Variability and Uncertainty       High       × 1       1       clear documentation of variability and uncertainty         Overall Quality Determination <sup>†</sup> Unacceptable       4.0       Metric Mean Score: 2.1.	Worker Activity:			various activiti	ies, tray o	cleaning					
EVALUATION       Domain       Metric       Rating       MWF*       Score       Comments         Domain 1: Reliability       Metric 1:       Methodology       High $\times 1$ 1       NIOSH         Domain 2: Representative       Metric 2:       Geographic Scope       High $\times 1$ 1       US         Metric 3:       Applicability       Unacceptable $\times 2$ 8       Vapor degreasing with 1,1,1-TCE, not in scope         Metric 4:       Temporal Representativeness       Low $\times 2$ 6       1995         Metric 5:       Sample Size       High $\times 1$ 1       21 pbz12 area         Domain 3: Accessibility/Clarity       Metric 6:       Metadata Completeness       High $\times 1$ 1       Clear documentation of data sources, methods, results and assumptions         Domain 4: Variability and Uncertainty       Metric 7:       Metadata Completeness       High $\times 1$ 1       clear documentation of variability and uncertainty         Overall Quality Determination <sup>†</sup> Unacceptable       4.0       Metric Metric 2:1.       Continued on next page	Exposure Duratio	on:		full-shift15-mir	n						
EVALUATION       Domain       Metric       Rating       MWF*       Score       Comments         Domain 1: Reliability       Metric 1:       Methodology       High       × 1       1       NIOSH         Domain 2: Representative       Metric 2:       Geographic Scope       High       × 1       1       US         Metric 3:       Applicability       Unacceptable       × 2       8       Vapor degreasing with 1,1,1-TCE, not in scope         Metric 4:       Temporal Representativeness       Low       × 2       6       1995         Metric 5:       Sample Size       High       × 1       1       21 pbz12 area         Domain 3: Accessibility/Clarity       Metric 6:       Metric 6:       Metric 7:       Metric 7:       Metric 7:         Domain 4: Variability and Uncertainty       Metric 7:       Metric 7:       Metric 7:       Metric 7:       Metric 7:       Metric 7:         Overall Quality Determination <sup>†</sup> Unacceptable       4.0       Metric Mean Score: 2.1.											
Domain     Metric     Rating     MWF*     Score     Comments       Domain 1: Reliability Metric 1:     Methodology     High     × 1     1     NIOSH       Domain 2: Representative Metric 2:     Geographic Scope     High     × 1     1     US       Metric 3:     Applicability     Unacceptable     × 2     8     Vapor degreasing with 1,1,1-TCE, not in scope       Metric 4:     Temporal Representativeness     Low     × 2     6     1995       Metric 5:     Sample Size     High     × 1     1     21 pbz12 area       Domain 3: Accessibility/Clarity Metric 6:     Metadata Completeness     High     × 1     1     Clear documentation of data sources, methods, results and assumptions       Domain 4:     Variability and Uncertainty Metric 7:     Metadata Completeness     High     × 1     1     clear documentation of variability and uncertainty       Overall Quality Determination <sup>†</sup> Unacceptable     4.0     Metric Mean Score: 2.1.	EVALUATION										
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments				
$\begin{array}{c c c c c c c c c c c c c c c c c c c $											
Metric 1:       Methodology       High $\times 1$ 1       NIOSH         Domain 2:       Representative       Metric 2:       Geographic Scope       High $\times 1$ 1       US         Metric 3:       Applicability       Unacceptable $\times 2$ 8       Vapor degreasing with 1,1,1-TCE, not in scope         Metric 4:       Temporal Representativeness       Low $\times 2$ 6       1995         Metric 5:       Sample Size       High $\times 1$ 1       21 pbz12 area         Domain 3:       Accessibility/Clarity       Metric 6:       Metadata Completeness       High $\times 1$ 1       Clear documentation of data sources, methods, results and assumptions         Domain 4:       Variability and Uncertainty       Metric 7:       Metadata Completeness       High $\times 1$ 1       clear documentation of variability and uncertainty         Overall Quality Determination <sup>†</sup> Unacceptable       4.0       Metric Mean Score: 2.1.	Domain 1: Reliab	oility		TT: 1	1	1					
$\begin{array}{c cccc} Domain 2: \ Representative & & & & & \\ Metric 2: & Geographic Scope & High & \times 1 & 1 & US \\ Metric 3: & Applicability & Unacceptable & \times 2 & 8 & Vapor degreasing with 1,1,1-TCE, not in scope \\ Metric 4: & Temporal Representativeness & Low & \times 2 & 6 & 1995 \\ Metric 5: & Sample Size & High & \times 1 & 1 & 21 \ pbz12 \ area & & \\ \hline Domain 3: \ Accessibility/Clarity & & & & \\ Metric 6: & Metadata \ Completeness & High & \times 1 & 1 & \\ Metric 6: & Metadata \ Completeness & High & \times 1 & 1 & \\ \hline Domain 4: \ Variability \ and \ Uncertainty & & & \\ Metric 7: & Metadata \ Completeness & High & \times 1 & 1 & \\ \hline Overall \ Quality \ Determination^{\dagger} & & & \\ \hline Overall \ Quality \ Determination^{\dagger} & & \\ \hline Unacceptable & 4.0 & Metric \ Metric $		Metric 1:	Methodology	High	$\times 1$	1	NIOSH				
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	Domain 2: Repres	sentative									
Metric 3:       Applicability       Unacceptable $\times 2$ 8       Vapor degreasing with 1,1,1-TCE, not in scope         Metric 4:       Temporal Representativeness       Low $\times 2$ 6       1995         Metric 5:       Sample Size       High $\times 1$ 1       21 pbz12 area         Domain 3:       Accessibility/Clarity       Metric 6:       Metadata Completeness       High $\times 1$ 1       Clear documentation of data sources, methods, results and assumptions         Domain 4:       Variability and Uncertainty       Metric 7:       Metadata Completeness       High $\times 1$ 1       clear documentation of variability and uncertainty         Overall Quality Determination <sup>†</sup> Unacceptable       4.0       Metric Mean Score: 2.1.	Domain <b>1</b> , 100pro,	Metric 2:	Geographic Scope	High	× 1	1	US				
Metric 4:       Temporal Representativeness       Low $\times 2$ 6       1995         Metric 5:       Sample Size       High $\times 1$ 1       21 pbz12 area         Domain 3:       Accessibility/Clarity       Metric 6:       Metadata Completeness       High $\times 1$ 1       Clear documentation of data sources, methods, results and assumptions         Domain 4:       Variability and Uncertainty       Metric 7:       Metadata Completeness       High $\times 1$ 1       clear documentation of variability and uncertainty         Overall Quality Determination <sup>†</sup> Unacceptable       4.0       Metric Mean Score: 2.1.		Metric 3:	Applicability	Unacceptable	$\times 2$	8	Vapor degreasing with 1,1,1-TCE, not in scope				
Metric 5:       Sample Size       High       × 1       1       21 pbz12 area         Domain 3:       Accessibility/Clarity Metric 6:       Metadata Completeness       High       × 1       1       Clear documentation of data sources, methods, results and assumptions         Domain 4:       Variability and Uncertainty Metric 7:       Metadata Completeness       High       × 1       1       clear documentation of variability and uncertainty         Overall Quality Determination <sup>†</sup> Unacceptable       4.0       Metric Mean Score: 2.1.		Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1995				
Domain 3: Accessibility/Clarity Metric 6: Metadata Completeness       High $\times 1$ 1       Clear documentation of data sources, methods, results and assumptions         Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness       High $\times 1$ 1       clear documentation of variability and uncertainty         Overall Quality Determination <sup>†</sup> Unacceptable       4.0       Metric Mean Score: 2.1.		Metric 5:	Sample Size	High	$\times 1$	1	21 pbz12 area				
Domain 3: Accessibility/Clarity       Metric 6: Metadata Completeness       High $\times 1$ 1       Clear documentation of data sources, methods, results and assumptions         Domain 4: Variability and Uncertainty       Metric 7: Metadata Completeness       High $\times 1$ 1       clear documentation of variability and uncertainty         Overall Quality Determination <sup>†</sup> Unacceptable       4.0       Metric Mean Score: 2.1.											
Metric 6:       Metadata Completeness       High $\times 1$ 1       Clear documentation of data sources, methods, results and assumptions         Domain 4:       Variability and Uncertainty       Metric 7:       Metadata Completeness       High $\times 1$ 1       clear documentation of variability and uncertainty         Overall Quality Determination <sup>†</sup> Unacceptable       4.0       Metric Mean Score: 2.1.	Domain 3: Access	sibility/Clari	ity	TT: 1	-	-					
Domain 4: Variability and Uncertainty         Metric 7:       Metadata Completeness         High       × 1       1       clear documentation of variability and uncertainty         Overall Quality Determination <sup>†</sup> Unacceptable       4.0       Metric Mean Score: 2.1.		Metric 6:	Metadata Completeness	Hìgh	× 1	1	Clear documentation of data sources, methods, results and as- sumptions				
Domain 4: Variability and Uncertainty         Metric 7: Metadata Completeness         High       × 1       1       clear documentation of variability and uncertainty         Overall Quality Determination <sup>†</sup> Unacceptable       4.0       Metric Mean Score: 2.1.											
Metric $i$ :       Metadata Completeness       High $\times$ 1       1       clear documentation of variability and uncertainty         Overall Quality Determination <sup>†</sup> Unacceptable       4.0       Metric Mean Score: 2.1.	Domain 4: Variat	Matuia 7	ncertainty Mata data Gammalatana	II:l.	1	1					
Overall Quality Determination <sup>†</sup> Unacceptable 4.0 Metric Mean Score: 2.1.		Metric 7:	Metadata Completeness	High	× 1	1	clear documentation of variability and uncertainty				
Continued on part page	Overall Quality Determination $^{\dagger}$			Unacceptable		4.0	Metric Mean Score: 2.1.				
VOULTURED DO DESC DAVE			(	Continued on new	rt nage						

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Source Citation:	Krake, A. M.,Herrera-Moreno, V 1995. Corporation, Independence, Kansas.	Health hazard	evaluation report n	o. HETA-95-0296-2547, Automotive Controls
Type of Data Source	Occupational Exposure; Monitoring Data;			
Hero ID	3859374			
EVALUATION				
Domain	Metric	Rating	$MWF^*$ Score	Comments
-				

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\*\* Consistent with our Application of Systematic Review in TSCARisk Evaluations document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

\* MWF = Metric Weighting Factor

Source Citation:	Hills, B.,Klincewicz, S.,Blade, L. M.,Sack, D.: 1989. Health hazard evaluation report no. HETA-87-367-1987, BMY Corpora- tion. A Division of Harsco Corporation. York. Pennsylvania						
Type of Data Source Hero ID	Occupational Exposure; Monitoring Data; 3859375						
EXTRACTION							
Parameter	Data						
Life Cycle Stage:			Use				
Life Cycle Descrip	otion (Subca	tegory of Use):	Touch-up pain	t			
Route of Exposure	e:		inhalation				
Exposure Concent	tration (Uni	t):	n.d. to 1.7 ppr	n (pbz)			
Number of Sample	es:		17  pbz				
Number of Sites:			1				
Worker Activity:			various activiti	es			
Exposure Duratio	uration: full-shift						
EVALUATION							
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments	
Domain 1: Reliab	ility						
	Metric 1:	Methodology	High	$\times 1$	1	NIOSH	
Domain 2: Repres	entative						
	Metric 2:	Geographic Scope	High	$\times 1$	1	US	
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	not in scope	
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1987	
	Metric 5:	Sample Size	High	$\times 1$	1	17 pbz	
Domain 3: Access	ibility/Clari	t					
Domain 5. Access	Metric 6:	Metadata Completeness	High	$\times 1$	1	Clear documentation of data sources, methods, results and as- sumptions	
Domain 4: Variab	Motrie 7:	Motadata Completeness	High	× 1	1	along documentation of verificities and versatistic	
	metric /:	metadata Completeness	111811	X 1	1	clear documentation of variability and uncertainty	
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	Unacceptable		4.0	Metric Mean Score: 2.1.	
		(	Continued on nex	t page			

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Source Citation:	Hills, B.,Klincewicz, S.,Blade, L. M.,Sack tion, A Division of Harsco Corporation,	, D 1989. Health York, Pennsylvania	n hazard e a.	evaluation	report no. HETA-87-367-1987, BMY Corpora-		
Type of Data Source	Occupational Exposure; Monitoring Data;						
Hero ID	3859375						
EVALUATION							
Domain	Metric	Rating	$\rm MWF^{\star}$	Score	Comments		

\* MWF = Metric Weighting Factor

Source Citation:	Love, J. F Washingto	R.,Kern, M 1981. Health haz n. DC.	ard evaluation	report n	o. HE	ΓA-81-065-938, METRO Bus Maintenance Shop,
Type of Data Source Hero ID	Occupation 3859376	nal Exposure; Monitoring Data;				
EXTRACTION						
Parameter			Data			
Life Cycle Stage:			Uso			
Life Cycle Description (Subcategory of Use):			Degreasing			
Route of Exposur	e:	liegory of ese).	inhalation			
Exposure Concent	tration (Uni	t):	3  n.d.7  not ana	alyzed for	dioxan	ie
Number of Sampl	es:	,	10 area	U		
Number of Sites:			1			
Type of Measurement or Method:			Gas Chromato	graphy w	/flame	ionization
EVALUATION						
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments
Domain 1: Reliab	oility					
	Metric 1:	Methodology	High	$\times 1$	1	NIOSH
Domain 2: Repres	sentative					
	Metric 2:	Geographic Scope	High	$\times 1$	1	US
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	not in scope
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1981
	Metric 5:	Sample Size	High	$\times 1$	1	10 samples
Domain 3: Access	sibility/Clar	itv				
	Metric 6:	Metadata Completeness	Low	$\times 1$	3	non-detects or not analyzed
Domain 4: Variah	oility and Ur	ncertainty				
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	non-detects or not analyzed
Overall Quality D	eterminatio	n†	Unacceptable		4.0	Metric Mean Score: 2.6.
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			Press Pres	8-	
Source Citation:	Love, J. R.,Kern, M 1981. Washington, DC.	Health hazard evaluat	ion report no.	НЕТА-81-065-938,	METRO Bus Maintenance Shop,
Type of Data Source	Occupational Exposure; Monit	oring Data;			
Hero ID	3859376				
EVALUATION					
Domain	Metric	Rating	$MWF^{\star}$	Score	Comments

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\*\* Consistent with our Application of Systematic Review in TSCARisk Evaluations document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

\* MWF = Metric Weighting Factor

Source Citation:	Fidler, A. T., Crandall, M. S., Kerndt, P. R., 1988. Health hazard evaluation report no. HETA-86-051-1911, National Cover of Atlanta, Inc., Lawrenceville, Georgia						
Type of Data Source Hero ID	Occupation 3859377	Occupational Exposure; Monitoring Data; 3859377					
EXTRACTION							
Parameter	Data						
Life Cycle Stage:	Use						
Life Cycle Description (Subcategory of Use):			Silkscreening				
Route of Exposur	e:		inhalation				
Exposure Concen	tration (Uni	t):	n.d to 3.89 ppr	n (pbz)n	.d. to 3	.5 ppm (STEL)n.d. to 0.42 ppm (area)	
Number of Sampl	es:		34 pbz3 STEL2	24 area			
Number of Sites:			1				
Worker Activity:			various activiti	es			
Exposure Duratio	on:		Full-shift				
EVALUATION							
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments	
Domain 1: Reliab	vility						
	Metric 1:	Methodology	High	$\times 1$	1	NIOSH	
Domain 2: Repres	sentative						
Domain 2. Ropro.	Metric 2:	Geographic Scope	High	× 1	1	US	
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	not in scope	
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1988	
	Metric 5:	Sample Size	High	$\times 1$	1	60 samples	
Domain 3: Access	sibility/Clari	ity					
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Clear documentation of data sources, methods, results and assumptions	
Domain 4. Variah	ility and Ur	agentainty					
Domain 4. Variat	Metric 7:	Metadata Completeness	High	$\times 1$	1	clear documentation of variability and uncertainty	
Overall Quality Determination <sup><math>\dagger</math></sup>			Unacceptable		4.0	Metric Mean Score: 2.1.	
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Source Citation:	Fidler, A. T., Crandall, M. S., Kerndt, P. R. of Atlanta, Inc., Lawrenceville, Georgia.	. 1988. Healt	n hazard e	evaluation report no.	HETA-86-051-1911, National Cover			
Type of Data Source	Occupational Exposure; Monitoring Data;							
Hero ID	3859377							
EVALUATION								
Domain	Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments			

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\*\* Consistent with our Application of Systematic Review in TSCARisk Evaluations document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

\* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID	Reh, B. D. Occupation 3970466	. 1995. Health hazard evaluatio nal Exposure; Monitoring Data;	n report no. HE	TA-94-02	298, Ger	n Corp Automotive, Wabash, Indiana.
EXTRACTION						
Parameter			Data			
Life Cycle Stage:			Use			
Life Cycle Descrip	otion (Subca	ategory of Use):	1,1,1-TCE use	in auto r	nfg	
EVALUATION						
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments
Domain 1: Reliab	ility					
	Metric 1:	Methodology	High	× 1	1	NIOSH
Domain 2: Repres	sentative					
	Metric 2:	Geographic Scope	High	$\times 1$	1	US
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	not in scope
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1995
	Metric 5:	Sample Size	N/A		N/A	N/A - No data for dioxane
Domain 3: Access	ibility/Clari	ity				
Domain 9. Access	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.
Domain 4. Variah	:liter and He	a conta inter				
Domain 4: Variat	Motric 7	Motadata Completeness	N/A		N/A	No Commont
	MEULIC 1.	Metadata Completeness	11/ A		1 <b>1</b> /A	No Comment.
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	Unacceptable		4.0	Metric Mean Score: 2.7.

\* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID	Niosh, 198 Occupation 3974954	87. Health hazard evaluation rep nal Exposure; Monitoring Data;	port no. HETA-8	34-108-18	21, Nie	mand Industries, Inc., Statesville, NC.
EXTRACTION						
Parameter			Data			
Life Cycle Stage:			Use			
Life Cycle Descrit	otion (Subca	tegory of Use):	adhesive for pa	perwoun	d packa	ging
Exposure Concent	tration (Uni	t):	7-14 ppm	·r ·- ·· · ···-	- F	00
Number of Sampl	es:		22			
Exposure Duratio	n:		8-hr TWA			
EVALUATION						
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments
Domain 1: Beliah	ility					
Domain 1. 1(chab	Metric 1:	Methodology	High	$\times 1$	1	NIOSH
Domain 2: Bopros	sontativo					
Domain 2. Repres	Metric 2.	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	not in scope
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1987
	Metric 5:	Sample Size	High	$\times 1$	1	22 samples
Domain 2. Access	ibility /Class	: <b>.</b>				
Domain 5: Access	Metric 6:	Metadata Completeness	High	$\times 1$	1	Clear documentation of data sources, methods, results and as- sumptions
Demain 4. W. 11	:1:41 TT					
Domain 4: Variab	Metric 7.	Metadata Completeness	High	× 1	1	clear documentation of variability and uncertainty
		notadata compreteness		~ 1	1	clear documentation of variability and uncertainty
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	Unacceptable		4.0	Metric Mean Score: 2.1.

\* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID	Atsdr, 20 Occupation 3978119	12. 1,4- Dioxane - ToxFAQs. nal Exposure; Reports for Data	or Information (	Other tha	n Expo	sure or Release Data;
EXTRACTION Parameter			Data			
Life Cycle Stage:			General public	exposure	es	
EVALUATION						
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments
Domain 1: Reliab	ility Metric 1:	Methodology	High	× 1	1	ToxFAQs
Domain 2: Repres	sentative					
Domain 2. Ropro.	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	Consumer exposure information
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2012
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Access	ibility/Clar	ity	NT / A		NT / A	
	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.
Domain 4: Variab	ility and Ur	ncertainty				
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.
Overall Quality D	eterminatio	$\mathrm{n}^\dagger$	Unacceptable		4.0	Metric Mean Score: 2.0.

\* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID	Niosh, 202 Occupation 3978147	Niosh, 2014. International chemical safety cards (ICDC): 1, 4-dioxane. Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data; 3978147						
EXTRACTION								
Parameter			Data					
Life Cycle Stage:			All stages					
Life Cycle Descrip	otion (Subca	ategory of Use):	All life cycle st	ages				
Route of Exposur	e:	/	inhalation, der	mal				
EVALUATION								
Domain		Metric	Rating	$\mathbf{MWF}^{\star}$	Score	Comments		
Demein 1. Delieb	:1:							
Domain 1: Reliad	Motric 1	Mathadalagy	High	× 1	1	NIOSH		
	Methe 1.	Wethodology	Ingn	~ 1	1	NIOSII		
Domain 2: Repres	sentative							
*	Metric 2:	Geographic Scope	High	$\times 1$	1	US		
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	No engineering information.		
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2015		
	Metric 5:	Sample Size	N/A		N/A	No Comment.		
Domain 3: Access	sibility/Clari	ity						
Domain 9. Meees	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.		
Domain 4: Variab	oility and Ur	ncertainty			<b>NT / A</b>			
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.		
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	Unacceptable		4.0	Metric Mean Score: 2.0.		

\* MWF = Metric Weighting Factor

Source Citation:	Sapphire, Group. 2007. Voluntary Children's Chemical Evaluation Program [VCCEP]. Tiers 1, 2, and 3 Pilot Submission For 1 4-Dioyane							
Type of Data Source Hero ID	Occupatio 3809038	Occupational Exposure; Completed Exposure or Risk Assessments; 3809038						
EXTRACTION Parameter			Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Exposure Concentration (Unit): Number of Sites: Worker Activity: Number of Workers:			All stages All life cycle stages Table 6-1 (p.128) provides multiple datasets of PBZ sampling 52 companies (2004 TRI) various activities <10,000					
<b>EVALUATION</b> Domain		Metric	Rating	$MWF^*$	Score	Comments		
Domain 1: Reliab	ility Metric 1:	Methodology	Medium	× 1	2	Ferro Corp submission for VCCEP		
Domain 2: Repres	sentative							
	Metric 2:	Geographic Scope	High	$\times 1$	1	US		
	Metric 3:	Applicability	High	$\times 2$	2	In scope, many of the sources for pbz data are other HERO sources already extracted		
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2007		
	Metric 5:	Sample Size	High	$\times 1$	1	Multiple		
Domain 3: Access	sibility/Clar Metric 6:	ity Metadata Completeness	High	$\times 1$	1	Clear documentation of data sources, methods, results and as- sumptions		
Domain 4: Variab	oility and Un Metric 7:	ncertainty Metadata Completeness	High	$\times 1$	1	clear documentation of variability and uncertainty		
Overall Quality D	Determinatio	$\mathbf{n}^{\dagger}$	High		1.3			

Source Citation:	M. T. Okawa, M. J. Coye. 1982. Health Hazard Evaluation Report, No. HETA-80-144-1109, Film Processing Industry, Hollywood California									
Type of Data Source	Occupatio	nal Exposure: Monitoring Data:								
Hero ID	1316845									
EXTRACTION										
Parameter			Data							
Life Cycle Stage:			Film Ce	ement						
Life Cycle Descrip	otion (Subca	ategory of Use):	Film Ce	ement						
Route of Exposur	e:		inhalati	on						
Exposure Concen	tration (Uni	it):	less tha	less than 1 ppm						
Number of Sampl	es:	,	4 pbz, 1	4 pbz, 1 area						
Number of Sites:			2	2						
Type of Measurer	ment or Met	hod:	pbz, are	ea						
Worker Activity:			splicing	splicing						
Number of Worke	ers:		4							
Type of Sampling:				pbz, area						
Exposure Duratic	on:		6 hr							
EVALUATION										
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments				
Domain 1, Daliah	:1:4									
Domain 1: Relian	Motrie 1.	Mathadalagy	High	$\sim 1$	1	NIOCH				
	Metric 1.	Methodology	Ingn	~ 1	1	NIOSH				
Domain 2: Repres	sentative									
	Metric 2:	Geographic Scope	High	$\times 1$	1	US				
	Metric 3:	Applicability	High	$\times 2$	2	Film cement, film splicing				
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1982				
	Metric 5:	Sample Size	High	$\times 1$	1	2 sites, 3 workers				
Domain 3: Access	sibility/Clar	ity								
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Clear documentation of data sources, methods, results and as- sumptions				
Domain 4. Variat	vility and U	ncortainty								
Domain 4. variat	Metric 7.	Metadata Completeness	High	× 1	1	clear documentation of variability and uncertainty				
	TALEDITE 1.	metadata Completeness	111511	~ 1	T					
	Continued on next page									

			-	10	
Source Citation:	M. T. Okawa, M. J. Coye. 1982. Healt Hollywood, California.	h Hazard	Evaluati	on Report, No.	HETA-80-144-1109, Film Processing Industry,
Type of Data Source	Occupational Exposure; Monitoring Data	;			
Hero ID	1316845				
EVALUATION					
Domain	Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments
Overall Quality D	$\operatorname{Petermination}^{\dagger}$	High		1.4	

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\* MWF = Metric Weighting Factor
 † If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.</li>

Source Citation: Type of Data Source Hero ID	BASF. 201 Occupatio 5079874	16. Analytical Reports and Data nal Exposure; Monitoring Data;	Summaries	from We	orker M	onitoring at the US Facility for 1,4-Dioxane Production.	
EXTRACTION Parameter			Data				
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Route of Exposure: Exposure Concentration (Unit): Number of Samples: Number of Sites: Type of Measurement or Method: Exposure Duration: Analytic Method:			Manufacturing Manufacturing Inhalation provided in report, most less than 2 ug/sample 28 1 absorbant tubes, OVM badges lists time in minutes for each sample NIOSH 1602				
<b>EVALUATION</b> Domain		Metric	Rating	MWF*	Score	Comments	
Domain 1: Reliab	oility Metric 1:	Methodology	High	$\times 1$	1	AIHA Accredited Laboratory for Industrial Hygiene, NIOSH 1602	
Domain 2: Repre	sentative Metric 2: Metric 3: Metric 4: Metric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	High High Medium High	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \\ \times \ 1 \end{array}$	$\begin{array}{c} 1\\ 2\\ 4\\ 1\end{array}$	US Domestic Manufacture up to 2011 Representative sample size	
Domain 3: Access	sibility/Clar Metric 6:	ity Metadata Completeness	High	× 1	1	Provides method, supporting data	
Domain 4: Variab	Metric 7:	ncertainty Metadata Completeness	Medium	× 1	2	some discussion of variability	
Overall Quality I	Determinatio	$\mathbf{n}^{\dagger}$	High		1.3		

\* MWF = Metric Weighting Factor

Source Citation:	BASF. 2017. Information in response to the "Preliminary information on manufacturing, processing, distribution, use, and disposal: 1 4-diogane" document							
Type of Data Source Hero ID	Occupational Exposure; Monitoring Data; 3827415							
EXTRACTION								
Parameter			Data					
Life Cycle Stage:			Manufact	uring				
Life Cycle Descrit	Life Cycle Description (Subcategory of Use):			uring				
Route of Exposur	e:		Inhalation	1				
Exposure Concen	tration (Uni	it):	0.39 ppm	15-mii	n STEI	L)<0.056 ppm (8-hr TWA)38 ppm (15-min		
			STEL)0.2	3 ppm (8	8-hr TW	VA)		
Number of Sampl	es:		4					
Number of Sites:			1					
Worker Activity:			Routine d	luties, ne	utraliza	ation, evaporator dump		
Exposure Duratio	on:		$15 \min S$	$\Gamma EL, 8 h$	r TWA			
EVALUATION								
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments		
Domain 1, Paliah	;];+							
Domain 1. Kenau	Metric 1.	Methodology	Medium	$\times 1$	2	Monitoring by BASE		
	MICUIC 1.	Wethodology	Wiedrum	~ 1	2	Monitoring by BASP		
Domain 2: Repres	sentative							
*	Metric 2:	Geographic Scope	High	$\times 1$	1	US		
	Metric 3:	Applicability	High	$\times 2$	2	Domestic Manufacture		
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2017		
	Metric 5:	Sample Size	Medium	$\times 1$	2	small sample size (4 points)		
<b>D</b>								
Domain 3: Access	sibility/Clar	ity	т	1	0			
	Metric 6:	Metadata Completeness	Low	× 1	3	No discussion of methods, results, assumptions, etc.		
Domain 4. Variah	ility and U	ncontaint						
Domain 4. variat	Motric 7	Motadata Completeness	Low	$\sim 1$	3	No discussion		
	MENIC 1:	metadata Completelless	LOW	^ 1	J	110 UISCUSSIOII.		
Orronall Ougliter F	otominatio	nt	Modium		17			
Overall Quality L	eterminatio	011 <sup>-</sup>	Mealum		1.1			

Source Citation: Type of Data Source Hero ID	J. Huber. 2018. Roofing: A Guide to the Options. Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data; 5080509							
EXTRACTION Parameter			Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Worker Activity:			Use Spray polyurethane foam a typical two-story, 2,300-square-foothouse with a medium-pitch roof " has a roof area of about 1,500 squarefeet					
EVALUATION		Matric	Dating		Seeme	Commente		
Domain		Metric	Rating	M W F ^	Score	Comments		
Domain 1: Reliab	ility Metric 1:	Methodology	Low	$\times 1$	3	General estimates for roofing. Data sources not specified.		
Domain 2: Repres	sentative							
	Metric 2:	Geographic Scope	High	$\times 1$	1	US		
	Metric 3:	Applicability	High	$\times 2$	2	Spray Polyurethane Foam		
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2018		
	Metric 5:	Sample Size	N/A		N/A	No Comment.		
Domain 3: Access	sibility/Clar Metric 6:	ity Metadata Completeness	Low	× 1	3	No discussion of methods, results, assumptions, etc.		
		<b>^</b>						
Domain 4: Variab	ility and U	ncertainty	T	1	0			
	Metric 7:	Metadata Completeness	Low	× 1	3	No discussion.		
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	Medium		1.8			

Source Citation: Type of Data Source Hero ID	HomeAdvisor. 2018. How Much Do Asphalt Shingles & Roofs Cost To Install Or Replace?. Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data; 5080525							
EXTRACTION			Data					
			Data					
Life Cycle Stage:			Use					
Life Cycle Descrip	otion (Subca	ategory of Use):	Spray pol	lyurethan	e foam			
Worker Activity:			an averag	ge size ho	use is 1 <sub>.</sub>	500 square feet of roofing		
EVALUATION								
Domain		Metric	Rating	$\mathbf{MWF}^{\star}$	Score	Comments		
Domain 1: Reliab	ility Matula 1	Matha dala ma	τ	<b>1</b>	9			
	Metric 1:	Methodology	LOW	× 1	3	General estimates for roofing. Data sources not specified.		
Domain 2: Repres	entative							
×.	Metric 2:	Geographic Scope	High	$\times 1$	1	US		
	Metric 3:	Applicability	High	$\times 2$	2	Spray Polyurethane Foam		
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2018		
	Metric 5:	Sample Size	N/A		N/A	No Comment.		
	·1 ·1·· / <i>C</i> 1	•,						
Domain 3: Access	Motrie 6	Motodoto Completeness	Low	× 1	9			
	Metric 0:	Metadata Completeness	LOW	× 1	ა	No discussion of methods, results, assumptions, etc.		
Domain 4: Variab	ility and U	ncertainty						
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	No discussion.		
		+						
Overall Quality D	eterminatio	n'	Medium		1.8			

\* MWF = Metric Weighting Factor
 † If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.</li>

Source Citation: Type of Data Source Hero ID	OMG Roofing Products. 2018. Product Data Specifications: OMG Olybond500 Insulation Adhesive. Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data; 5080523						
EXTRACTION Parameter			Data				
Life Cycle Stage:			Use		c		
Life Cycle Descrip Worker Activity	otion (Subca	ategory of Use):	Spray pol	yurethan	ie toam	1.1 motio	
worker Activity:			MIX A-side and B-side in 1:1 ratio				
EVALUATION							
Domain		Metric	Rating	$MWF^*$	Score	Comments	
Domain 1. Reliability							
Domain 1. Renad	Metric 1:	Methodology	Medium	$\times 1$	2	Company Product Specification Sheet	
		00					
Domain 2: Repres	sentative						
	Metric 2:	Geographic Scope	High	$\times 1$	1	US	
	Metric 3:	Applicability	High	$\times 2$	2	Spray Polyurethane Foam	
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2018	
	Metric 5:	Sample Size	N/A		N/A	No Comment.	
Domain 3: Access	sibility/Clar	ity					
	Metric 6:	Metadata Completeness	Low	$\times 1$	3	No discussion of methods, results, assumptions, etc.	
Domain 4: Variab	ility and U	ncertainty			2		
	Metric 7:	Metadata Completeness	Low	× 1	3	No discussion.	
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	High		1.6		

\* MWF = Metric Weighting Factor
 † If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.</li>

Source Citation: Type of Data Source Hero ID	GAF. 2014. Safety Data Sheet: OlyBond Part B (Amber/Red). Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data; 5080527							
EXTRACTION Parameter			Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Worker Activity:			Use Spray polyurethane foam 0.1 percent 1,4-dioxane in B-Side					
EVALUATION		M	D. (		q			
Domain		Metric	Rating	MWF*	Score	Comments		
Domain 1: Reliab	ility Metric 1:	Methodology	High	$\times 1$	1	SDS		
Domain 2: Repres	sentative	<b>a</b> 11 <b>a</b>						
	Metric 2:	Geographic Scope	High	× 1	1	US		
	Metric 3:	Applicability	High High	× 2	2	Spray Polyurethane Foam		
	Metric 4: Metric 5:	Sample Size	N/A	× 2	N/A	2014 No Comment.		
Domain 3: Access	sibility/Clar	ity						
	Metric 6:	Metadata Completeness	Low	$\times 1$	3	No discussion of methods, results, assumptions, etc.		
Domain 4: Variability and Uncertainty			Low	× 1	3	No discussion		
Overall Quality D	Determinatio	n <sup>†</sup>	High		1.5			

\* MWF = Metric Weighting Factor
<sup>†</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.</li>

KTRACTION Parameter		Data						
i urumeter		Data						
Life Cycle Stage:		Use						
Life Cycle Description (S	bcategory of Use):	Dry Film	Lubrica	tion				
Physical Form:		liquid						
Route of Exposure:		inhalation	n					
Exposure Concentration	Unit):	< 0.031 tc	550  ppm					
Number of Samples:		25						
Number of Sites:		1						
Type of Measurement or Method:			area	_				
Worker Activity:		Manufact	ure, App	olication	- also provides specific activity descriptions			
Type of Sampling:			area					
Exposure Duration:			varied					
Engineering Control & percent Exposure Reduction:			haust hoc	d	N C			
PPE:		Tyvek la	b coat, b	utyl glo	wes, " face respirator with organic vapor car-			
Arrelatio Matheal		triages, s	arety glas	sses with	n side snields, butyl gloves			
Analytic Method:		MOSII I	002/Dire	ct neau	(MIIIITAE 2000)			
ALUATION								
Domain	Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments			
Domain 1: Reliability								
Metric	1: Methodology	Medium	$\times 1$	2	Monitoring by DoE/KCNSC			
Domain 2: Representative	2. Coorrentie Soone	II: mb	× 1	1	IIC			
Metric	2: Geographic Scope	High	× 1 × 2	1	US Du Che heleiseata			
Metric	5: Applicability 4: Tomporal Boprosontativonoss	High	$\times 2$	2	Dry film lubricants			
Metric	<ul> <li>Temporal Representativeness</li> <li>Sample Size</li> </ul>	High	$\sim 4$ $\sim 1$	2 1	2010 - 2014 Having individual complex allows full above staring in			
Motrio	5. Sample Size	Ingn	~ 1	1	tribution			
Metric								
Metric Domain 3: Accessibility/0	Jarity							
Domain 3: Accessibility/6	Clarity 6: Metadata Completeness	Medium	$\times 1$	2	Includes the most critical information, but lacks some mo			

		conti	nucu nom p	nevious	page	
Source Citation: Type of Data Source Hero ID	M. Stites. Occupation 5099258	2018. [RE: Discussion Follow- nal Exposure; Monitoring Dat	·up]. a;			
EVALUATION						
Domain		Metric	Rating	$\rm MWF^{\star}$	Score	Comments
Domain 4: Variab	ility and Un Metric 7:	certainty Metadata Completeness	Low	× 1	3	Data do not inform variability in exposures
Overall Quality D	etermination	$\mathbf{n}^{\dagger}$	High		1.4	

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\* MWF = Metric Weighting Factor

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Source Citation:M. StitesType of Data SourceOccupatiHero ID5099257	. 2018. [FW: 1,4-Dioxane]. onal Exposure; Reports for Data	or Informat	tion Othe	er than	Exposure or Release Data;		
EXTRACTION Parameter		Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Number of Sites: Number of Workers: Type of Sampling: Engineering Control & percent Exposure Reduction:		Use Dry Film Lubrication 8 up to 10: Approximately 3-4 employees work in the chemical material area where the dry film lubricant is formulated. Another 5-6 employees work in the paint shop where the dry film lubricant is spray applied. 8-hr TWA Engineering controls (powered vented hoods) are employed which pro- vide inhalation protection and dermal protection is provided by requiring chemical resistant gloves, safety glasses with side shields and lab apron when handling 1,4-Dioxane. Any exposure that might occur is well be- low regulatory action levels (reference previously provided personal and area monitoring data).					
EVALUATION Domain	Metric	Rating	MWF*	Score	Comments		
Domain 1: Reliability Metric 1:	Methodology	Medium	× 1	2	Information provided by DoE/KCNSC		
Domain 2: Representative Metric 2: Metric 3: Metric 4: Metric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	High High High N/A	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \end{array}$	1 2 2 N/A	US Dry film lubricants 2018 No Comment.		
Domain 3: Accessibility/Cla Metric 6:	rity Metadata Completeness	N/A		N/A	No Comment.		
Domain 4: Variability and U Metric 7:	Incertainty Metadata Completeness	N/A		N/A	No Comment.		
Continued on next page							

	- contin	ued from	previous	page			
Source Citation: Type of Data Source Hero ID	M. Stites. 2018. [FW: 1,4-Dioxane]. Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data; 5099257						
EVALUATION							
Domain	Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments		
Overall Quality I	$\operatorname{Petermination}^{\dagger}$	High		1.2			

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\* MWF = Metric Weighting Factor

## Facility

Source Citation:Niosh, 1977. Criteria for a recommended standard occupational exposure to dioxane.Type of Data SourceFacility; Reports for Data or Information Other than Exposure or Release Data;Hero ID62937								
EXTRACTION Parameter		Data						
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description: Total Annual U.S. Volume (and percent of PV):		Manufacture Manufacture Manufacture of dioxane via dehydrogenation of ethylene glycol 10 million pounds (1 large)5 million pounds (1 large)1 million pounds (1 small)						
Number of Sites: Possible Physical Form:			and 2 sm	all facil	lities			
EVALUATION								
Domain	Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments			
Domain 1: Reliability Metric 1	Methodology	High	$\times 1$	1	NIOSH report			
Domain 2: Representative								
Metric 2 Metric 3 Metric 4 Metric 5	<ul> <li>Geographic Scope</li> <li>Applicability</li> <li>Temporal Representativeness</li> <li>Sample Size</li> </ul>	High High Low N/A	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \end{array}$	1 2 6 N/A	US occupational scenario within the scope of the risk evaluation 1977 No Comment.			
Domain 3: Accessibility/Cla Metric 6	arity Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and as- sumptions			
Domain 4: Variability and Metric 7	Uncertainty Metadata Completeness	High	× 1	1	clear documentation of variability and uncertainty			
Overall Quality Determinat	ion <sup>†</sup>	High		1.5				

Source Citation: Type of Data Source Hero ID	Nicnas, 1998. 1, 4-Dioxane. Priority existing chemical assessment report No. 7. Facility; Completed Exposure or Risk Assessments; 3827412								
EXTRACTION									
Parameter			Data						
Life Cycle Stage:			Commerc	ial Use					
Life Cycle Descri	ption (Subca	ategory of Use):	Laborator	ry use					
Total Annual U.S	. Volume (a	nd percent of PV):	500  kg						
EVALUATION									
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments			
Domain 1: Reliab	oility								
	Metric 1:	Methodology	High	$\times 1$	1	NICNAS			
Domain 2: Repre	sentative								
	Metric 2:	Geographic Scope	Medium	$\times 1$	2	Australia			
	Metric 3:	Applicability	High	$\times 2$	2	occupational scenario within the scope of the risk evaluation			
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	1998			
	Metric 5:	Sample Size	N/A		N/A	$\rm N/A.$ Assessment uses modeling to estimate occupational exposures; report does not include any monitoring data.			
Domain 3: Access	sibility/Clar	ity							
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Clear documentation of data sources, methods, results and assumptions			
Domain 4: Variat	oility and U	ncertainty							
	Metric 7:	Metadata Completeness	Medium	$\times 1$	2	Limited discussion of variability and uncertainty			
Overall Quality I	Determinatio	$\mathrm{n}^\dagger$	High		1.5				

Source Citation: Type of Data Source Hero ID	Nicnas,. 19 Facility; C 3827412	998. 1, 4-Dioxane. Priority exist ompleted Exposure or Risk Asse	ing chemica essments;	al assessn	nent rep	port No. 7.	
EXTRACTION Parameter			Data				
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description: Total Annual U.S. Volume (and percent of PV): Number of Sites: Chemical Concentration:			Commercial, Potential Consumer Use Film Cement Film is cut with special tool, the adhesive applied with a small brush (manually). Film joined and heated to 35 deg C to dry 12 L (1 site) Up to 10 film labs in Aus 10-50 percent				
EVALUATION		Motrie	Pating		Saoro	Commonto	
Domani		Metric	nating	IVI VV F	Score	Comments	
Domain 1: Reliab	ility Metric 1:	Methodology	High	$\times 1$	1	NICNAS	
Domain 9. Poppor	antativo						
Domain 2. Repres	Metric 2.	Geographic Scope	Medium	× 1	2	Australia	
	Metric 3:	Applicability	High	$\times 2$	2	occupational scenario within the scope of the risk evaluation	
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	1998	
	Metric 5:	Sample Size	N/A		N/A	N/A. Assessment uses modeling to estimate occupational exposures; report does not include any monitoring data.	
Domain 3: Access	sibility/Clar	ity					
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Clear documentation of data sources, methods, results and assumptions	
Domein 4. Veriah	ility and II-	acortainty					
Domain 4. Variat	Metric 7:	Metadata Completeness	Medium	$\times 1$	2	Limited discussion of variability and uncertainty	
Overall Quality D	eterminatio	n <sup>†</sup>	High		1.5		

\* MWF = Metric Weighting Factor <sup>†</sup> If any individual metrics are deem

Source Citation: Type of Data Source Hero ID	Nicnas, 1 Facility; C 3827412	998. 1, 4-Dioxane. Priority exist completed Exposure or Risk Asso	ing chemica essments;	al assessn	nent rep	port No. 7.	
EXTRACTION			_				
Parameter			Data				
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description: Total Annual U.S. Volume (and percent of PV): Number of Sites:			Processing Pharmaceutical intermediate Used in the reaction medium to produce pharmaceuticals 100 kg 1				
EVALUATION							
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments	
Domain 1: Reliab	ility Metric 1:	Methodology	High	$\times 1$	1	NICNAS	
Domain 2: Repres	Sentative Motrie 2:	Coorranhia Soona	Modium	× 1	0	A rest of Pro	
	Metric 2:	Applicability	High	$\times 1$ $\times 2$	2	Australia	
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	1998	
	Metric 5:	Sample Size	N/A	~ 2	N/A	N/A. Assessment uses modeling to estimate occupational exposures; report does not include any monitoring data.	
Demeir 2. Acces	:1:1:4 / <i>C</i> 1	:					
Domain 3: Access	Metric 6:	Metadata Completeness	High	$\times 1$	1	Clear documentation of data sources, methods, results and as- sumptions	
	·1:41 TT						
Domain 4: Variat	Metric 7:	Metadata Completeness	Medium	$\times 1$	2	Limited discussion of variability and uncertainty	
Overall Quality D	Determinatio	$\mathbf{n}^{\dagger}$	High		1.5		

Source Citation:ToxNet Hazardous Substances Data, Bank. 2017. HSDB: 1,4-Dioxane.Type of Data SourceFacility; Reports for Data or Information Other than Exposure or Release Data;Hero ID3970270								
EXTRACTION Parameter		Data						
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description:		Manufacture Manufacture of dioxane via dehydrogenation of ethylene glycol Manufactured commercially by dehydration and ring closure of diethy- lene glycol. Concentrated sulfuric acid is catalyst. Continurous process, dioxane vaporized and passed through an acid trap and two distillation columns to remove water and purify.						
Number of Sites:		1						
Chemical Concentration:		90 pero	ent					
EVALUATION								
Domain	Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments			
Domain 1: Reliability Metric 1:	Methodology	High	$\times 1$	1	Process Description: Ullman's Encyclopedia of Industrial Chemistry Site: 2012 CDR			
Domain 2: Roprosontativo								
Metric 2:	Geographic Scope	High	$\times 1$	1	US			
Metric 3:	Applicability	High	$\times 2$	2	Manufacturing			
Metric 4:	Temporal Representativeness	High	$\times 2$	2	2012			
Metric 5:	Sample Size	N/A		N/A	Not applicable			
Domain 3: Accessibility/Clar	rity							
Metric 6:	Metadata Completeness	High	$\times 1$	1	Cites sources clearly			
Domain 4: Variability and Uncertainty		Lor	v 1	9				
Metric 7:	Metadata Completeness	LOW	× 1	ა	No discussion/not applicable			
Overall Quality Determination	$\mathrm{n}^\dagger$	High		1.2				

Source Citation:1996. Solvents study.Type of Data SourceFacility; Completed Exposure or Risk Assessments;Horo ID3860540								
Parameter		Data						
		_						
Life Cycle Stage:		Processin	g, Use, D	isposal				
Process Description (Subca	ategory of Use):	Multiple, Mutliple	see p. 37	Torat 7 and 2	Dreakdown of the 27 total sites			
Trocess Description.		of use of of	chemical	within	each industry			
Total Annual U.S. Volume (a	nd percent of PV):	101,577  k	g/yr use	for all 2	7 sites; contains breakdown of use by industry			
		on p. 45						
Number of Sites:		27, includ	es site lo	cations				
Site Daily Throughput: Describle Physical Form:		Can be es	stimated	based c	on total use and $\#$ of sites			
Possible Physical Form:			vent					
EVALUATION								
Domain	Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments			
Domain 1: Beliability								
Metric 1:	Methodology	High	$\times 1$	1	US EPA Solvents Study, trusted source			
Domain 2: Representative	Caamankia Saana	II: mb	V 1	1	TIG .			
Metric 2: Metric 3:	Applicability	пі <u>g</u> п High	$\times 1$ $\times 2$	1	US			
Metric 4:	Temporal Representativeness	Low	$\times 2 \times 2$	6	1993 RCRA 3007 Questionairre			
Metric 5:	Sample Size	Low	$\times 1$	3	Distribution of samples is qualitative or characterized by no statistics			
	•,							
Domain 3: Accessibility/Clar.	Ity Motadata Completeness	High	$\vee$ 1	1	Clear documentation of data sources matheda another a large			
Metric 0.	Metadata Completeness	Iligii	× 1	1	Clear documentation of data sources, methods, results and as- sumptions			
Domain 4. Variability and U	acertainty							
Metric 7:	Metadata Completeness	Medium	× 1	2	Limited discussion of variability and uncertainty			
				-				
Overall Quality Determinatio	$\mathbf{n}^{\dagger}$	Medium		1.8				

\* MWF = Metric Weighting Factor
 † If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.</li>

Source Citation:2017. Chemical data reporting: 1,4-Dioxane.Type of Data SourceFacility; Reports for Data or Information Other than Exposure or Release Data; 3860451Hero ID3860451								
EXTRACTION								
Parameter			Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Number of Sites:		Manufacturing, processing, and use Manufacturing, use (non-incorporative activities), paints and coatings, laundry and dishwashing products 1 (manufacturing); 25-99 (non-incorp use); unknown for other uses						
Possible Physical	Form:		liquid					
<b>EVALUATION</b> Domain		Metric	Rating	MWF*	Score	Comments		
Domain 1: Reliab	ility Metric 1:	Methodology	High	$\times 1$	1	US EPA CDR, trusted source		
Domain 2: Repres	sentative							
1	Metric 2:	Geographic Scope	High	$\times 1$	1	US		
	Metric 3:	Applicability	High	$\times 2$	2	occupational scenario within the scope of the risk evaluation		
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2017		
	Metric 5:	Sample Size	Medium	$\times 1$	2	Distribution of samples is characterized by a range with uncer- tain statistics. It is unclear if analysis is representative.		
Domain 2: Accord	aibility /Clar	i+.,						
Domain 5. Access	Metric 6:	Metadata Completeness	Low	$\times 1$	3	CDR Site data - underlying methods, sources, assumptions not transparaent		
Domain 4: Variah	vility and U	acortainty						
	Metric 7:	Metadata Completeness	Low	$\times 1$	3	No discussion/not applicable		
Overall Quality Determination <sup>†</sup>		High		1.6				

Source Citation: Type of Data Source Hero ID	1995. OPI Facility; R 3860496	PT chemical fact sheets: 1, 4-Dic deports for Data or Information (	oxane fact s Other than	heet: Suj Exposure	pport de e or Rel	ocument. ease Data;	
EXTRACTION Parameter			Data				
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description: Total Annual U.S. Volume (and percent of PV): Number of Sites:			Manufacturing manufacturing contains information on various uses, see p. 2 between 10,500,000 and 18,300,000 pounds (as of 1990) 3 (as of 1992)				
<b>EVALUATION</b> Domain		Metric	Rating	$MWF^{\star}$	Score	Comments	
Domain 1: Reliab	ility Metric 1:	Methodology	High	× 1	1	US EPA OPPT Chemical Fact Sheet, trusted source	
Domain 2: Repres	Metric 2: Metric 3: Metric 4: Metric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	High High Low Medium	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \\ \times \ 1 \end{array}$	$\begin{array}{c} 1\\ 2\\ 6\\ 2\end{array}$	US occupational scenario within the scope of the risk evaluation 1995 literature search Distribution of samples is characterized by a range with uncer- tain statistics. It is unclear if analysis is representative.	
Domain 3: Access	ibility/Clar Metric 6:	ity Metadata Completeness	High	$\times 1$	1	Clear documentation of data sources, methods, results and as- sumptions	
Domain 4: Variab	oility and Un Metric 7:	ncertainty Metadata Completeness	Medium	× 1	2	Limited discussion of variability and uncertainty	
Overall Quality D	eterminatic	$\mathrm{n}^{\dagger}$	Medium		1.7		

Source Citation:	Anderson, R. H., Anderson, J. K., Bower, P. A Co-occurrence of 1,4-dioxane with trichloroethylene in chlorinated solvent groundwater plumes at US Air Force installations: Fact or fiction. Integrated Environmental Assessment and Management.								
Type of Data Source Hero ID	Facility; C 1065024	Facility; Completed Exposure or Risk Assessments; 1065024							
EXTRACTION Parameter			Data						
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Total Annual U.S. Volume (and percent of PV): Possible Physical Form: Chemical Concentration:			Manufacturing, processing, and use manufacturing, use as stabilizer in chlorinated solvents Between 1 and 10 million pounds annually liquid 3.5 percent by volume for use as stabilizer						
<b>EVALUATION</b> Domain		Metric	Rating	$MWF^{\star}$	Score	Comments			
Domain 1: Reliab	ility Metric 1:	Methodology	High	× 1	1	US Air Force Engineering Dept, trusted source			
Domain 2: Repres	entative								
	Metric 2:	Geographic Scope	High	$\times 1$	1	US			
	Metric 3:	Applicability	High	$\times 2$	2	occupational scenario within the scope of the risk evaluation			
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2012			
	Metric 5:	Sample Size	Medium	$\times 1$	2	Distribution of samples is characterized by a range with uncer- tain statistics. It is unclear if analysis is representative.			
Domain 3: Access	ibility/Clar	ity							
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Clear documentation of data sources, methods, results and assumptions			
Domain 4: Variab	ility and U	ncertainty							
	Metric 7:	Metadata Completeness	Medium	$\times 1$	2	Discusses variability, but not uncertainy			
Overall Quality Determination <sup>†</sup>		High		1.2					

Type of Data SourceFacility; Completed Exposure or Risk Assessments;Hero ID3809027								
EXTRACTION								
Parameter		Data						
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description: Total Annual U.S. Volume (and percent of PV): Number of Sites: Possible Physical Form:		Manufacturing, processing, and use entire life cycle source contains description of manufacturing, processing, and multiple uses Between 1 and 10 million pounds annually (as of 2006) Lists one manufacturing site (BASF), which also reports processing and use of chemical liquid, vapor						
<b>EVALUATION</b> Domain	Metric	Rating	MWF*	Score	Comments			
Domain 1: Reliability Metric 1:	Methodology	High	× 1	1	TSCA Work Plan Chemical			
Domain 2: Representative		0						
Metric 2:	Geographic Scope	High	$\times 1$	1	US			
Metric 3:	Applicability	High	$\times 2$	2	occupational scenario within the scope of the risk evaluation			
Metric 4: Metric 5:	Temporal Representativeness Sample Size	High Medium	$\times 2 \times 1$	$\frac{2}{2}$	2015 Distribution of samples is characterized by a range with uncer- tain statistics. It is unclear if analysis is representative.			
Domain 3: Accessibility/Clar Metric 6:	ity Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and as- sumptions			
Domain 4: Variability and U Metric 7:	ncertainty Metadata Completeness	Medium	$\times 1$	2	Discusses variability, but not uncertainy			
Overall Quality Determination <sup>†</sup>		High		1.2				

Source Citation: U.S. E. P. A. 2015. TSCA work plan chemical problem formulation and initial assessment. 1.4-Dioxane.

\* MWF = Metric Weighting Factor
Source Citation:Atsdr., 20Type of Data SourceFacility; FHero ID3982333	12. Toxicological profile for 1,4-o teports for Data or Information (	lioxane. Other than	Exposure	e or Rel	lease Data;		
EXTRACTION Parameter		Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description: Total Annual U.S. Volume (and percent of PV): Number of Sites:			Manufacturing Manufactured in a closed system by acid catalyzed conversion of diethy- lene glycol via dehydration and ring closure 1-10 million lbs in 2002 2 sites (DOW in TX and Ferro Corp in LA)				
<b>EVALUATION</b> Domain	Metric	Rating	$MWF^{\star}$	Score	Comments		
Domain 1: Reliability Metric 1:	Methodology	High	× 1	1	ATSDR Toxicological Profile		
Domain 2: Representative							
Metric 2:	Geographic Scope	High	$\times 1$	1	US		
Metric 3:	Applicability	High	$\times 2$	2	Scenario within the scope of the risk evaluation		
Metric 4:	Temporal Representativeness	High	$\times 2$	2	2012		
Metric 5:	Sample Size	High	$\times 1$	1	TRI Sites		
Domain 3: Accessibility/Clar Metric 6:	ity Metadata Completeness	High	$\times 1$	1	Clear documentation of data sources, methods, results and as- sumptions		
Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness		Medium	$\times 1$	2	Discusses variability, but not uncertainy		
Overall Quality Determination <sup>†</sup>		High		1.1			

Source Citation:Atsdr., 2012. Toxicological profile for 1,4-dioxane.Type of Data SourceFacility; Reports for Data or Information Other than Exposure or Release Data;Hero ID3982333									
EXTRACTION									
Parameter		Data							
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Number of Sites:			Manufacturing, processing, and use entire life cycle Source lists number of facilities by state that produce, process, or use Dioxane. Also identifies lifecycle stage. Based on TRI data from 2007						
EVALUATION									
Domain	Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments				
Domain 1: Reliability Metric 1	Methodology	High	× 1	1	ATSDR Toxicological Profile				
Domain 2: Representative	Communitie Comm	TT:1.	<b>1</b>	1					
Metric 2	Applicability	High	$\times 1$	1	US Second within the second of the right evolution				
Metric 3	Temporal Representativeness	High	$\times 2$ $\times 2$	2	2012				
Metric 5	Sample Size	High	$\times 1^{\times 2}$	1	TRI Sites				
Domain 3: Accessibility/Cla Metric 6	arity Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and as- sumptions				
	•								
Domain 4: Variability and	Uncertainty	Madia	v 1	0					
Metric 7	Metadata Completeness	Medium	× 1	2	Discusses variability, but not uncertainy				
Overall Quality Determination <sup><math>\dagger</math></sup>		High		1.1					

Source Citation: Type of Data Source Hero ID	Nih, 2016. Report on carcinogens: 1,4-Dioxane. Facility; Reports for Data or Information Other than Exposure or Release Data; 3982327								
EXTRACTION									
Parameter			Data						
Life Cycle Stage:			Manufacturing, processing, and use						
Life Cycle Descrip	otion (Subca	ategory of Use):	entire li	fe cycle					
Total Annual U.S	. Volume (a	nd percent of PV):	1-10 mi	llion lbs l	between	n 1994 and 2006			
Number of Sites:			$1 \mathrm{mfg}, 2$	26 US Su	ppliers	(2009)			
EVALUATION									
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments			
Domain 1: Paliability									
	Metric 1:	Methodology	High	$\times 1$	1	Department of Health and Human Services NTP			
Domain 2: Repres	sentative								
- •• ••F-••	Metric 2:	Geographic Scope	High	$\times 1$	1	US			
	Metric 3:	Applicability	High	$\times 2$	2	Scenario within the scope of the risk evaluation			
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2016			
	Metric 5:	Sample Size	N/A		N/A	No Comment.			
Domain 3: Access	sibility/Clar	itv							
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Clear documentation of data sources, methods, results and assumptions			
Domain 4: Variah	vility and U	acertainty							
	Metric 7:	Metadata Completeness	High	× 1	1	clear documentation of variability and uncertainty			
Overall Quality Determination <sup>†</sup>		High		1.0					

Source Citation: Type of Data Source Hero ID	Ec, 2004. Recommendation from the Scientific Committee on Occupational Exposure Limits for 1,4-dioxane. Facility; Reports for Data or Information Other than Exposure or Release Data; 3827409								
EXTRACTION									
Parameter			Data						
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description: Total Annual U.S. Volume (and percent of PV):			Manufacturing Manufacturing acid-catalysed conversion of diethylene glycol by ring closure in a closed system 10,000 tonnes/yr (global)						
EVALUATION									
Domain		Metric	Rating	$\rm MWF^{\star}$	Score	Comments			
Domain 1: Reliab	ility Metric 1:	Methodology	High	× 1	1	European CommissionEmployment, Social Affairs and Inclu- sion			
Domain 2: Repres	sentative								
	Metric 2:	Geographic Scope	Medium	$\times 1$	2	Global mfg data (not just US mfg)			
	Metric 3:	Applicability	High	$\times 2$	2	Scenario within the scope of the risk evaluation			
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	Paper is from 2004, but global PV data is from 1995			
	Metric 5:	Sample Size	High	$\times 1$	1	Global Data for all producers at the time			
Domain 3: Access	sibility/Clar Metric 6:	ity Metadata Completeness	High	$\times 1$	1	Clear documentation of data sources, methods, results and as-			
Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness		Medium	× 1	2	States that in general the global production is decreasing				
Overall Quality Determination <sup>†</sup>		Medium		1.7					

Source Citation: Type of Data Source Hero ID	Environme Facility; R 3981144	Environment Canada, Health Canada. 2010. Screening assessment for the challenge 1,4-dioxane. Facility; Reports for Data or Information Other than Exposure or Release Data; 3981144								
EXTRACTION			Data							
Parameter			Data							
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Total Annual U.S. Volume (and percent of PV):		Manufact entire life 10,000-10	Manufacture, import, processing, use entire life cycle 10,000-100,000 kg mfg10,000-100,000 kg import10,000-100,000 kg used							
EVALUATION										
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments				
Domain 1: Reliab	ility Metric 1:	Methodology	High	$\times 1$	1	Environment Canada/Health Canada				
Domain 2: Repre	sentative			_	_					
	Metric 2:	Geographic Scope	Medium	$\times 1$	2	Canada				
	Metric 3:	Applicability	High	$\times 2$	2	Scenarios within the scope of the risk evaluation				
	Metric 4: Metric 5:	Sample Size	High N/A	× 2	2 N/A	2010 No Comment.				
Domain 3: Access	sibility/Clar Metric 6:	ity Metadata Completeness	, High	× 1	1	Clear documentation of data sources, methods, results and as- sumptions				
Domain 4: Variab	bility and U Metric 7:	ncertainty Metadata Completeness	High	$\times 1$	1	clear documentation of variability and uncertainty				
Overall Quality Determination <sup>†</sup>			High		1.1					

Source Citation:	U.S. E. P. A. 1978. OAQPS guideline series: Control of volatile organic emissions from manufacture of synthesized pharma-								
Type of Data Source Hero ID	Facility; R 3970050	eports for Data or Information (	Other tha	n Expos	ure or F	Release Data;			
EXTRACTION									
Parameter			Data						
Life Cycle Stage:			Use						
Life Cycle Descrip	otion (Subca	ategory of Use):	Industri	ial Use -	Pharma	aceuticals			
Process Description:			Series o and dry	f batch o ring. Giv	peration res info	ns: reaction(s), product separation, purification, on equipment used on page 2-1 and Ch 3, PFD			
Number of Sites:				2-1 .armaceu	tical pla	ants in the US and territories			
EVALUATION									
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments			
Domain 1. Reliab	ility								
	Metric 1:	Methodology	High	$\times 1$	1	EPA OAQPS			
Domain 2: Repres	sentative								
Domain <b>1</b> , 100pro.	Metric 2:	Geographic Scope	High	$\times 1$	1	US			
	Metric 3:	Applicability	High	$\times 2$	2	Scenarios within the scope of the risk evaluation			
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1978			
	Metric 5:	Sample Size	N/A		N/A	No Comment.			
Domain 3: Access	sibility/Clari	ity							
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Clear documentation of data sources, methods, results and as- sumptions			
Domain 4: Variat	Motrie 7	Matadata Completeness	II: mh	× 1	1				
	Metric (:	Metadata Completeness	nigh	× 1	1	clear documentation of variability and uncertainty - states gen- eralizations are difficult since there is a lot of variability be- tween plants and volumes of chemicals used			
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	High		1.5				

\* MWF = Metric Weighting Factor
† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.</li>

Source Citation: Type of Data Source Hero ID	Ecjrc,. 200 Facility; C 196351	02. European Union risk assessm ompleted Exposure or Risk Asse	essments;	1,4-diox	ane. 2n	d Priority List.	
EXTRACTION Parameter			Data				
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Process Description:		Manufacturing Manufacturing dehydration and ring closure of diethylene glycol. Process temperature varies from 130-200"C, under atmospheric pressure. The process is con-					
Number of Sites:	tinuous 1 site in I	EU					
EVALUATION							
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments	
Domain 1: Reliab	ility Metric 1:	Methodology	High	$\times 1$	1	European Chemicals Bureau	
Domain 2. Benres	sentative		_				
Domain 2. Repres	Metric 2:	Geographic Scope	Medium	$\times 1$	2	EU	
	Metric 3:	Applicability	High	$\times 2$	2	Scenarios within the scope of the risk evaluation	
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2002	
	Metric 5:	Sample Size	N/A		N/A	No Comment.	
Domain 3: Access	sibility/Clar	itv					
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Clear documentation of data sources, methods, results and assumptions	
Domain 4: Variah	oility and U	ncertainty					
	Metric 7:	Metadata Completeness	High	$\times 1$	1	clear documentation of variability and uncertainty	
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	High		1.4		

Source Citation: Type of Data Source Hero ID	Ecjrc, 2002. European Union risk assessment report: 1,4-dioxane. 2nd Priority List. Facility; Completed Exposure or Risk Assessments; 196351								
EXTRACTION			Data						
Parameter			Data						
Life Cycle Stage:	Life Cycle Stage:			Manufacturing, processing, use					
Life Cycle Descrip	ption (Subca	ategory of Use):	All life cy	cle stage	s				
Chemical Concent	tration:		Gives var	ious conc	entratio	ons for different uses (pg. 37).			
EVALUATION									
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments			
Domain 1: Reliab	oility								
	Metric 1:	Methodology	High	$\times 1$	1	European Chemicals Bureau			
Domain 2: Repres	sentative								
Domain 2. Repres	Metric 2:	Geographic Scope	Medium	$\times 1$	2	EU			
	Metric 3:	Applicability	High	$\times 2$	2	Scenarios within the scope of the risk evaluation			
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2002			
	Metric 5:	Sample Size	N/A		N/A	No Comment.			
Domain 3: Access	sibility/Clar	itv							
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Clear documentation of data sources, methods, results and assumptions			
Domain 4. Variat	oility and U	ncertainty							
	Metric 7:	Metadata Completeness	High	$\times 1$	1	clear documentation of variability and uncertainty			
Overall Quality D	Determinatio	$\mathbf{n}^{\dagger}$	High		1.4				

Source Citation: Type of Data Source Hero ID	Aca, 2015. Re: TSCA Work Plan Chemical Problem Formulaton and Initial Assessment for 1,4-Dioxane. Facility; Reports for Data or Information Other than Exposure or Release Data; 3809105									
EXTRACTION	0000100									
Parameter			Data							
Life Cycle Stage			Manufacturing Processing							
Life Cycle Descrip	tion (Subca	tegory of Use):	Manufa	cturing, 1	Processi	ing				
Total Annual U.S.	Volume (a	nd percent of PV):	1-10 mi	llion pou	nds (20	06 CDR)				
Number of Sites:			1  mfg25	-99 Proc						
Chemical Concentration:			>90 per	rcent						
EVALUATION										
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments				
Domain 1: Reliabi	lity									
	Metric 1:	Methodology	High	$\times 1$	1	2015 PF (US EPA)				
Domain 2: Repres	entative									
Domain <b>_</b> . respice	Metric 2:	Geographic Scope	High	$\times 1$	1	US				
	Metric 3:	Applicability	High	$\times 2$	2	Scenarios within the scope of the risk evaluation				
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2015				
	Metric 5:	Sample Size	N/A		N/A	No Comment.				
Domain 3: Access	ibilitv/Clari	tv								
	Metric 6:	Metadata Completeness	High	$\times 1$	1	Clear documentation of data sources, methods, results and assumptions				
Domain 4: Variah	ility and Un	ocertainty								
	Metric 7:	Metadata Completeness	High	$\times 1$	1	clear documentation of variability and uncertainty				
Overall Quality Determination <sup>†</sup>			High		1.0					

\* MWF = Metric Weighting Factor
 † If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.</li>

Source Citation:PType of Data SourceFHero ID3	Jource Citation:Pubchem, 2017. PubChem: 1,4-Dioxane.Cype of Data SourceFacility; Reports for Data or Information Other than Exposure or Release Data;Hero ID3970246									
EXTRACTION										
Parameter			Data							
Life Cycle Stage:	Life Cycle Stage:			Manufacturing						
Life Cycle Description	on (Subca	tegory of Use):	Manufact	uring						
Process Description:			Dehydrat	ion and i	ring clo	sure of diethylene glycol. Concentrated acid				
Chemical Concentration:			used as a >90 perce	used as a catalyst. Continuous process. >90 percent						
EVALUATION										
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments				
Domain 1: Reliabilit	Domain 1. Reliability									
N	letric 1:	Methodology	High	$\times 1$	1	NIH - PubChem				
Domain 2: Represen	tative									
N	Aetric 2:	Geographic Scope	High	$\times 1$	1	US				
Ν	Ietric 3:	Applicability	High	$\times 2$	2	Scenarios within the scope of the risk evaluation				
Ν	fetric 4:	Temporal Representativeness	High	$\times 2$	2	2017				
N	letric 5:	Sample Size	N/A		N/A	No Comment.				
Domain 3: Accossibi	ility /Clari	tar								
N	Inty/Clari Ietric 6:	Metadata Completeness	High	$\times 1$	1	Lists data sources				
Domain 4. Veriabili	tu and II-	agentainte								
N	ly and On Ietric 7:	Metadata Completeness	Medium	$\times 1$	2	Limited discussion of variability and uncertainty				
Overall Quality Determination <sup>†</sup>			High		1.1					

Source Citation: Type of Data Source Hero ID	U.S, E. P. A. 2017. Preliminary Information on Manufacturing, Processing, Distribution, Use, and Disposal: 1,4-Dioxane. Facility; Reports for Data or Information Other than Exposure or Release Data; 3986663								
EXTRACTION									
Parameter			Data						
Life Cycle Stage			Manufacture Import						
Life Cycle Descrip	otion (Subca	ategory of Use):	Manufact	ure, Imp	$\operatorname{ort}$				
Process Description	on:		Conc. Su	lfuric ac	id used	as catalyst. Temps from 130 to 200 deg C,			
Number of Sites:			pressure from 25-110 kPa. Continuous. 1 mfg1 import						
EVALUATION									
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments			
Domain 1: Reliab	ility								
	Metric 1:	Methodology	High	$\times 1$	1	EPA Use Dossier			
Domain 2: Ropros	ontativo								
Domain 2. Repres	Metric 2:	Geographic Scope	High	× 1	1	US			
	Metric 3:	Applicability	High	$\times 2$	2	Scenarios within the scope of the risk evaluation			
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2017			
	Metric 5:	Sample Size	N/A		N/A	No Comment.			
Domain 2. Accord	:h:l:ter/Class	:							
Domain 5: Access	Metric 6:	Metadata Completeness	High	$\times 1$	1	Lists data sources			
Domain 4: Variab	ility and Ur Metric 7:	Mata data Completeness	Madium	× 1	0	T			
	metric /:	Metadata Completeness	meanum	X 1	2	Limited discussion of variability and uncertainty			
Overall Quality Determination <sup><math>\dagger</math></sup>			High		1.1				

\* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID	U.S, E. P. A.: 2017. Preliminary Information on Manufacturing, Processing, Distribution, Use, and Disposal: 1,4-Dioxane. Facility; Reports for Data or Information Other than Exposure or Release Data; 3986663								
EXTRACTION Parameter			Data						
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Number of Sites: Chemical Concentration:			Manufacturing, processing, use Manufacturing, processing, use 25 mfg0 import13 proc21 other uses (2015 TRI) Provides table of SDS's with some conc. Information						
EVALUATION									
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments			
Domain 1: Reliab	ility Metric 1:	Methodology	High	× 1	1	EPA Use Dossier			
Domain 2: Repres	sentative Metric 2: Metric 3: Metric 4: Metric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	High High High N/A	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \end{array}$	1 2 2 N/A	US Scenarios within the scope of the risk evaluation 2017 No Comment.			
Domain 3: Access	sibility/Clar Metric 6:	ity Metadata Completeness	High	$\times 1$	1	Lists data sources			
Domain 4: Variat	bility and Un Metric 7:	ncertainty Metadata Completeness	Medium	× 1	2	Limited discussion of variability and uncertainty			
Overall Quality Determination <sup><math>\dagger</math></sup>			High		1.1				

\* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID	Ashford, F Facility; R 3859379	Ashford, R. D 2001. Ashford's Dictionary of Industrial Chemicals. Facility; Reports for Data or Information Other than Exposure or Release Data; 3859379						
EXTRACTION Parameter			Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use):			All stages All life cycle st	ages				
EVALUATION								
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments		
Domain 1: Reliab	ility Metric 1:	Methodology	High	$\times 1$	1	Ashford's Dictionary of Industrial Chemicals		
Domain 2: Repres	sentative							
Domain 2. Repres	Metric 2:	Geographic Scope	Medium	$\times 1$	2	England		
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	Just some basic physical properties information. Nothing use- ful.		
	Metric 4:	Temporal Representativeness	Low	$\times 2$	6	1994		
	Metric 5:	Sample Size	N/A		N/A	No Comment.		
Domain 3: Access	sibility/Clar	ity						
	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.		
Domain 4: Variab	ility and Uı Metric 7:	ncertainty Metadata Completeness	N/A		N/A	No Comment.		
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	Unacceptable		4.0	Metric Mean Score: 2.8.		

\* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID	Echa, 2017. 1,4-Dioxane. Facility; Reports for Data or Information Other than Exposure or Release Data; 3970664							
EXTRACTION			Data					
Parameter			Data					
Life Cycle Stage:			Manufacture, I	mport				
Life Cycle Descrip	otion (Subca	tegory of Use):	Manufacture, I	mport				
Total Annual U.S	. Volume (a	nd percent of PV):	MFG/import:	1,000 + t	ionnes (1	EU)		
EVALUATION								
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments		
Domain 1. Deliah	:1:4							
Domain 1: Kellad	Motric 1.	Mathadalagy	High	$\sim 1$	1	ECH A		
	MEULIC 1.	Methodology	IIIgii	~ 1	1	ECHA		
Domain 2: Repres	sentative							
*	Metric 2:	Geographic Scope	Medium	$\times 1$	2	EU		
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	MFG/import estimate for the EU (1000+ tonnes), other general hazard and use information.		
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2017		
	Metric 5:	Sample Size	N/A		N/A	No Comment.		
Domain 3: Access	sibility/Clari	ity	27/1		<b>NT / A</b>			
	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.		
Domain 4: Variab	oility and Ur	ncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.		
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	Unacceptable		4.0	Metric Mean Score: 2.2.		

\* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID	Oecd Exisiting Chemical Database. 1999. SIDs initial assessment profile: 1,4-Dioxane. Facility; Reports for Data or Information Other than Exposure or Release Data; 3970845							
EXTRACTION								
Parameter			Data					
Life Cycle Stage:			Manufacturing	, processi	ing, use			
Life Cycle Descrip	otion (Subca	tegory of Use):	Manufacturing	, processi	ing, use			
Total Annual U.S	. Volume (a	nd percent of PV):	8,000 - 10,000	tons (wo	rldwide	production)		
EVALUATION								
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments		
Domain 1: Reliab	Motrie 1.	Mathadalam	II: mh	V 1	1			
	Metric 1:	Methodology	підп	× 1	1	SIDS Initial Assessment profile		
Domain 2: Repres	sentative							
-	Metric 2:	Geographic Scope	Medium	$\times 1$	2	Australia		
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	No useful information		
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	1999		
	Metric 5:	Sample Size	N/A		N/A	No Comment.		
Domain 3: Accoss	vibility/Clari	it x7						
Domain 5. Access	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.		
-					· · ·			
Domain 4: Variab	oility and Ur	ncertainty	/ .					
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.		
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	Unacceptable		4.0	Metric Mean Score: 2.5.		

\* MWF = Metric Weighting Factor

Source Citation:	The Comn risk reduct	The Commission of the European, Communities. 2002. Commission recommendation on the results of risk evaluation and the risk reduction strategies for the substances: or anisidine 1.4 -dioxane							
Type of Data Source Hero ID	Facility; Reports for Data or Information Other than Exposure or Release Data; 3970846								
EXTRACTION									
Parameter			Data						
Life Cycle Stage:			Manufacturing	, process	ing, use				
Life Cycle Descrip	otion (Subca	ategory of Use):	Manufacturing	, process	ing, use				
EVALUATION									
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments			
Domain 1: Reliad	Motric 1.	Mathadalagy	High	× 1	1	The Commission of the European Communities			
	methe 1.	Wethodology	Ingn	~ 1	1	The Commission of the European Communities			
Domain 2: Repres	sentative								
	Metric 2:	Geographic Scope	Medium	$\times 1$	2	EU			
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	Recommendations in response to 2002 EU Risk Assessment			
	Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2002			
	Metric 5:	Sample Size	N/A		N/A	No Comment.			
Domain 2. Accord	ibility /Clan	:+							
Domain 5: Access	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.			
		*			'				
Domain 4: Variab	oility and Ur	ncertainty							
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.			
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	Unacceptable		4.0	Metric Mean Score: 2.5.			

\* MWF = Metric Weighting Factor

Source Citation:	Franz, C.,Bennett, S.,DeLeo, P. C.,Collatz, M.,Kelly, K.,Nekoomaram, J.,Wieroniey, S. 2015. Comments of the Adhesive and Sealant Council, the American Coatings Association, the American Chemistry Council, the American Cleaning Institute, the Consumer Specialty Products Association, and Waste Management on the 1,4-dioxane problem formulation and initial assessment.								
Type of Data Source Hero ID	Facility; Reports for Data or Information Other than Exposure or Release Data; 3986506								
EXTRACTION									
Parameter			Data						
Life Cycle Stage: Life Cycle Description (Subcategory of Use):		All stages All life cycle st	All stages All life cycle stages						
EVALUATION									
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments			
Domain 1: Reliab	ility Metric 1:	Methodology	High	$\times 1$	1	Public Comment from Industry Groups			
Domain 2: Repres	sentative								
×	Metric 2:	Geographic Scope	High	$\times 1$	1	US			
	Metric 3:	Applicability	Unacceptable	$\times 2$	8	General comments on previous problem formulation. No useful information			
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2015			
	Metric 5:	Sample Size	N/A		N/A	No Comment.			
Domain 3: Access	sibility/Clari	ity							
	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.			
Domain 4: Variab	oility and Ur	ncertainty							
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.			
Overall Quality D	eterminatio	$\mathbf{n}^{\dagger}$	Unacceptable		4.0	Metric Mean Score: 2.0.			

\* MWF = Metric Weighting Factor

Source Citation: Type of Data Source Hero ID	MakerBot Industries LLC. 2015. Safety data sheet: PLA 3D printer filament/MakerBot PLA. Facility; Reports for Data or Information Other than Exposure or Release Data; 5160198							
EXTRACTION Parameter			Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Chemical Concentration:		Use Printing >98 percent chemical that contains dioxane						
EVALUATION								
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments		
Domain 1: Reliab	oility Metric 1:	Methodology	High	$\times 1$	1	SDS		
Domain 2: Repre	sentative Metric 2: Metric 3: Metric 4:	Geographic Scope Applicability Temporal Representativeness	High High High	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \end{array}$	1 2 2	US 3D printing 2016		
	Metric 5:	Sample Size	N/A		N/A	No Comment.		
Domain 3: Access	sibility/Clari Metric 6:	ity Metadata Completeness	N/A		N/A	No Comment.		
Domain 4: Variab	oility and Ur Metric 7:	ncertainty Metadata Completeness	N/A		N/A	No Comment.		
Overall Quality Determination <sup>†</sup>			High		1.0			

\* MWF = Metric Weighting Factor
<sup>†</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.</li>

Source Citation:	Y. He, S. Kilsby, C. J. Tuck, R. D. Wildman, S. D. R. Christie, S. Edmondson, H. Yang. 2013. Processing Biodegradable Polycaprolactone through 3D Printing. 24th International SFF Symposium - An Additive Manufacturing Conference.								
Type of Data Source Hero ID	Facility; R 5080531	eports for Data or Information (	Other than	Exposur	e or Rel	ease Data;			
EXTRACTION			Data						
			Data						
Life Cycle Stage:			Use						
Life Cycle Descrip	ption (Subca	ategory of Use):	Printing						
Process Description	on:		PCL flake	es dissolv	ed in 99	.8 percent 1,4-dioxane. Ink samples settled for			
			24  hrs th	en stirree	d at 800	Orpm. Slides soaked in 2-propanol and dried.			
			2mL of in	k injecte	d in car	tridges.			
Chemical Concentration:			99.8 perce	ent , but	then m	ixed with PCL flakes to 5-10 percent PCL			
EVALUATION									
Domain		Metric	Rating	$MWF^{\star}$	Score	Comments			
Domain 1: Reliab	ollity		TT' 1	1	1				
	Metric 1:	Methodology	High	× 1	1	Research article			
Domain 2: Repres	sentative								
*	Metric 2:	Geographic Scope	Medium	$\times 1$	2	UK			
	Metric 3:	Applicability	High	$\times 2$	2	3D printing			
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2013			
	Metric 5:	Sample Size	N/A		N/A	No Comment.			
Domain 3: Accoss	zibility/Clar	itz							
Domain 5. Access	Metric 6	Metadata Completeness	N/A		N/A	No Comment			
	Methe 0.	Metadata Completeness	11/11		11/11	No comment.			
Domain 4: Variab	oility and U	ncertainty							
	Metric 7	Metadata Completeness	N/A		N/A	No Comment.			
	Micuric 1.	motadata compieteness	/						
	Wiether 1.		,						
Overall Quality D	Determinatio	n <sup>†</sup>	High		1.2				

Source Citation:	F. Ruggiero, P. A. Netti, E. Torino. 2015. Experimental Investigation and Thermodynamic Assessment of Phase Equilibria in the PLLA /Diogane /Water Ternary System for Applications in the Biomedical Field Langmuir									
Type of Data Source Hero ID	Facility; R 3538358	Facility; Reports for Data or Information Other than Exposure or Release Data; 3538358								
EXTRACTION										
Parameter			Data							
Life Cycle Stage:			Use							
Life Cycle Descrip	otion (Subca	ategory of Use):	Printing							
Process Description	on:		PLLA pe	llets add	ed to di	oxane and heated in a silicone oil bath. Con-				
Chamier I Chaman	L		denser pr	events di	oxane v	apors from escaping during heating.				
Chemical Concentration:			w/v)	ane mixe	a with I	PLLA (0.5 percent, 1 percent, and 1.5 percent				
EVALUATION										
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments				
Domain 1: Reliab	ility									
	Metric 1:	Methodology	High	$\times 1$	1	Research article				
Domain 2: Repres	sentative									
Domain _ Topro	Metric 2:	Geographic Scope	Medium	$\times 1$	2	Italy				
	Metric 3:	Applicability	High	$\times 2$	2	3D printing				
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2015				
	Metric 5:	Sample Size	N/A		N/A	No Comment.				
Domain 3: Access	sibility/Clar	ity								
Domain 9. Meees	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.				
Domain 4: Variat	ility and Ui	ncertainty	DT / A							
	Metric 7:	Metadata Completeness	IN/A		N/A	No Comment.				
Overall Quality D	eterminatio	$\mathrm{n}^\dagger$	High		1.2					

Source Citation:	Y. He, R. D. Wildman, C. J. Tuck, S. D. Christie, S. Edmondson. 2016. An Investigation of the Behavior of Solvent based Polycoprolactone ink for Material Letting. Scientific Reports									
Type of Data Source Hero ID	Facility; R 3829109	Facility; Reports for Data or Information Other than Exposure or Release Data; 3829109								
EXTRACTION										
Parameter			Data							
Life Cycle Stage:			Use							
Life Cycle Descrit	otion (Subca	ategory of Use):	Printing							
Process Description	on:		PCL flake	es dissolv	ed in 99	.8 percent 1,4-dioxane. Ink samples settled for				
•			24  hrs th	en stirre	d at 800	Orpm. Slides soaked in 2-propanol and dried.				
			2mL of in	k injecte	d in cai	rtridges.				
Chemical Concent	tration:		99.8 perce	ent dioxa	ne mixe	ed with PCL (5 wt percent )				
EVALUATION										
EVALUATION		Matria	Deting	MANDA	<b>C</b>	Commente				
Domain		Metric	Rating	IVI VV F	Score	Comments				
Domain 1. Reliab	ility									
	Metric 1:	Methodology	High	$\times 1$	1	Research article				
Domain 2: Ropro	contativo									
Domain 2. Repres	Metric 2.	Geographic Scope	Medium	× 1	2	ЦК				
	Metric 3:	Applicability	High	$\times 2$	2	3D printing				
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2016				
	Metric 5:	Sample Size	N/A		N/A	No Comment.				
Domain 2. Accord	sibility /Clan	:+								
Domain 5. Access	Metric 6:	Metadata Completeness	$N/\Delta$		N/A	No Commont				
	Metric 0.	Metadata Completeness	11/11		11/11	No comment.				
Domain 4: Variab	ility and U	ncertainty								
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.				
Overall Quality Determination <sup><math>\dagger</math></sup>			High		1.2					

Source Citation: Type of Data Source Hero ID	Independent Lubricant Manufacturers, Association. 2014. RE: Proposition 65 warning regulation. Facility; Reports for Data or Information Other than Exposure or Release Data; 3982411							
EXTRACTION Parameter			Data					
Life Cycle Stage: Life Cycle Description (Subcategory of Use): Chemical Concentration:		Use MWF <1 ppb						
EVALUATION								
Domain		Metric	Rating	$\mathrm{MWF}^{\star}$	Score	Comments		
Domain 1: Reliab	oility Metric 1:	Methodology	Medium	× 1	2	Public Comment from Industry Groups		
Domain 2: Repre	sentative Metric 2: Metric 3: Metric 4:	Geographic Scope Applicability Temporal Representativeness	High High High	$\begin{array}{c} \times \ 1 \\ \times \ 2 \\ \times \ 2 \end{array}$	1 2 2	US MWF 2014		
	Metric 5:	Sample Size	N/A		N/A	No Comment.		
Domain 3: Access	sibility/Clar Metric 6:	ity Metadata Completeness	N/A		N/A	No Comment.		
Domain 4: Variab	oility and Ur Metric 7:	ncertainty Metadata Completeness	N/A		N/A	No Comment.		
Overall Quality Determination <sup>†</sup>		High		1.2				

\* MWF = Metric Weighting Factor
 † If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.</li>

Source Citation: Type of Data Source Hero ID	Spin,. 2017. SPIN substances in preparations in nordic countries 1,4,-dioxane. Facility; Reports for Data or Information Other than Exposure or Release Data; 3981126							
EXTRACTION								
Parameter			Data					
Life Cycle Stage:			Manufact	uring, pr	ocessing	2, 1150		
Life Cycle Descrip	otion (Subca	ategory of Use):	Manufact	uring, pr	ocessing	z, use		
Total Annual U.S	. Volume (a	nd percent of PV):	PV for di	fferent N	ordic co	buntries by industry in 2010-2014		
EVALUATION								
Domain		Metric	Rating	$MWF^*$	Score	Comments		
Domain 1: Poliability								
Domain 1. Renau	Metric 1.	Methodology	Medium	× 1	2	SPIN		
	Meerre 1.	Wethodology	meanin	~ 1		51 IIV		
Domain 2: Repres	sentative							
*	Metric 2:	Geographic Scope	Medium	$\times 1$	2	Nordic Countries		
	Metric 3:	Applicability	Medium	$\times 2$	4	Many industries listed are not in scope		
	Metric 4:	Temporal Representativeness	High	$\times 2$	2	2010-2014		
	Metric 5:	Sample Size	N/A		N/A	No Comment.		
Domain 3: Access	sibility/Clar	ity						
Domain 9. Hooos	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.		
Domain 4: Variat	ility and U	ncertainty	NT / A		NT / A			
	Metric 7:	Metadata Completeness	IN/A		IN/A	No Comment.		
Overall Quality Determination <sup><math>\dagger</math></sup>		Medium		1.7				

\* MWF = Metric Weighting Factor
 † If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.</li>

Source Citation: Sapphire, For 1.4-D	Sapphire, Group. 2007. Voluntary Children's Chemical Evaluation Program [VCCEP]. Tiers 1, 2, and 3 Pilot Submission For 1.4-Dioyane							
Type of Data SourceFacility;Hero ID3809038	Facility; Completed Exposure or Risk Assessments; 3809038							
EXTRACTION								
Parameter		Data						
Life Cycle Stage:		Manufact	uring					
Life Cycle Description (Sub	category of Use):	Manufact	uring					
Process Description:		3 method	s for mfg					
Total Annual U.S. Volume (	and percent of PV):	mfg: 1 m	illion lbs	(2003)i	mport: $<50,000$ lbs (2001)			
Number of Sites:		1 site in U	US					
Chemical Concentration:			cent					
EVALUATION								
Domain	Matric	Roting	MWF*	Score	Comments			
Domain	WEELIC	nating	IVI VV I	50016	Comments			
Domain 1: Beliability								
Metric 1:	Methodology	Medium	$\times 1$	2	Ferro Corp submission for VCCEP			
	00				*			
Domain 2: Representative								
Metric 2:	Geographic Scope	High	$\times 1$	1	US			
Metric 3:	Applicability	High	$\times 2$	2	In scope			
Metric 4:	Temporal Representativeness	Medium	$\times 2$	4	2007			
Metric 5:	Sample Size	High	$\times 1$	1	Multiple			
Domain 3. Accessibility/Cla	rity							
Metric 6:	Metadata Completeness	N/A		N/A	No Comment.			
	nietadata completeness			11/11				
Domain 4: Variability and U	Incertainty							
Metric 7:	Metadata Completeness	N/A		N/A	No Comment.			
	1							
Overall Quality Determinati	$\mathrm{on}^\intercal$	High		1.4				